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Except as indicated, abstracts are by William H. Stickel, editor.

NATURAL RESOURCES & CLIMATE

Allen, Durward L. (Purdue U.) RESOURCE ECOLOGY--NEGLECTED DISCIPLINE. Trans. 21st N. Am. Wildl. Conf. p. 72-82. 1956.

In managing the resource base of human beings in N. Am. we are affecting future population levels as well as the quality of living for individuals. This is the husbandry of man and a biological problem, but biologists seldom participate in government planning. Rapid expansion of both population and industry places in jeopardy outdoor resources for which there is increasing recreational demand. There is no longer a premium on producing more people on this continent. Yet that is what we are doing in building new communities and adding to the total resource base through hugely expensive reclamation programs. Tax subsidies are buying total development at impossible prices and destroying outdoor assets for which there is greater need each year. The indicated policy change is to withhold drainage and irrigation subsidies. This would be a particular benefit to sport fishing and hunting, and it would assure an undeveloped reserve in case of emergency need.--Author.

Allen, Shirley W. (U. Mich.) CONSERVING MICHIGAN'S NATURAL RESOURCES. Jack-Pine Warbler 34(3): 87-93. Sept. 1956.

Tells what the natural resources of Mich. are and outlines the agencies responsible for them. Lists a number of ways in which Mich. Audubon Soc. and its members can give constructive help with given conservation problems and with conservation in general. This list, with its mention of sources of information on current developments, should be useful in any part of the country.

Baum, Werner A., and James M. Havens. (Fla. State U.) RECENT CLIMATIC FLUCTUATIONS IN MARITIME PROVINCES. Trans. 21st N. Am. Wildl. Conf. p. 436-453. 1956.

Difficulties inherent in the use of climatological series to ascertain the existence of climatic fluctuations are outlined. Behavior of selected series is described with reference to the widely discussed fluctuation [temperature increase] of recent years. An extensive bibliography on the climatic-change problem is included.--W. A. Baum.

Darling, Frank Fraser. PELICAN IN THE WILDERNESS / A NATURALIST'S ODYSSEY IN NORTH AMERICA. Random House, N. Y. 380 p., 28 photos. 1956. $5.00.

Darling, a distinguished British naturalist, conservationist, and land-use expert, traveled all over the U. S. and Alaska and deep into Mexico under the sponsorship of the Rockefeller Found. and the Cons. Found. He saw desert and tundra, climax forests and eroding ranges. He worked with scores of our outstanding ecologists and conservationists and he talked with taximen, Indians, and Eskimo. His book is a popular record of his travels and findings for the people of America and Britain. Humorous and personal, it makes easy and interesting reading. Serious and perceptive, it shows us our strengths and weaknesses in land use through new eyes. Basically it is a travelog with personal reactions to cities and institutions, character sketches of conservationists, stories of field trips by horse and plane, observations on management and abuse of land, and discussions of wild animals and their management. Darling is appreciative toward Am. agencies and administrators and he is complimentary and colorful in telling about individuals, but he is plainly critical of some things. These include the hydrological work at Coweeta, predator and rodent control that is unjustified or made necessary only by abuse of land, the Matanuska farming project in Alaska, and a general lack of consideration of soil biology. As for wildlife management in Am., Darling feels that in both training and operations there is a romantic preoccupation with the game animals themselves and a gross lack of emphasis on the basic plant ecology on which wildlife work depends. With some exceptions, this no doubt is true, but like a few of Darling's other observations, it is debatable at least in degree. On the whole, however, the book is recommended to all classes of readers as interesting, colorful, informative, and stimulating. Every public and biological library should have it.

Graham, Edward H., and Wm. R. Van Dersal. (US Soil Cons. Serv.) WATER FOR AMERICA: THE STORY OF WATER CONSERVATION. Oxford U. Press (114 5th Ave., N. Y. 11, N. Y.). 111 p., illus. 1956. $3.50. [From review in Outdoor News Bul. 10(24).]

"To those who are familiar with the values of water, and to those who are not, WATER FOR AMERICA supplies a brief and highly readable summary of the origin and source of water, its uses by necessity as well as pleasure, the interdependence of all water users, how one use affects another, and the methods and citizen movements presently in operation to bring about the conservation of water for the use and benefit of all. In format, the book consists of 53 chapters--each exactly one page long--on every important phase of water, its use and misuse, and methods of conservation. A full page photograph accompanies each section."

Larsen, James A. (U. Wis. News Serv.) WISCONSIN'S RENEWABLE RESOURCES / A REPORT ON RESEARCH AT THE UNIVERSITY OF WISCONSIN INTO THE RENEWABLE RESOURCES OF FIELD, FOREST, LAKE AND STREAM. U. Wis. xiv + 160 p., illus. 1956.

An exceptionally attractive and readable account of conservation work done by past and present personnel of U. Wis. It is more than this, however, for it puts problems in well-rounded perspective, both historical and philosophical. Many fine photographs and significant quotations lend depth. Careful scrutiny by experts is apparent throughout the book. Part I takes up the history and forests of Wis. It is revealing to find that earnest and well-informed efforts at forest conservation were made--futilely--in the 1860s. Part II reviews wildlife work in 9 short, informative chapters. These deal with wildlife ecology, why species vanished or changed in range and abundance, bobwhite, whitetailed deer, pheasant and Hungarian partridge, waterfowl, sharptail and prairie grouse, basic research on animal ecology, and multiple use. Part III covers work on streams and lakes. The role of Wis. has been so great in conservation and ecological studies that this book is almost a handbook of conservation. As such it merits wide readership and educational use. The fact that it cites references for each chapter increases its value for this purpose. The publication was financed by the Wis. Alumni Res. Found. largely to attract more funds to the university, but this is handled in extremely good taste and does not detract from the book's wider usefulness.

Lemon, Paul C., and others. USING RESOURCES WISELY. N. Y. State Education Dept. 1-48 p., illus. 1956.

A handsomely produced booklet designed to advance teaching of conservation in N. Y. One section describes several highly effective demonstration and participation projects in which teachers took advantage of specific local situations. Much of the rest of the pamphlet lists projects and lines of inquiry suitable for each grade through junior high school. Organization of conservation teaching throughout a school, and training of teachers, are discussed concisely. The paper seems to strike a good balance between practical and esthetic. Approaches that are suggested are down-to-earth and worthwhile. The many good photographs and generally fine production make the publication physically attractive.

McMurry, John H., and David E. Christensen. (Fla. State U.) SOME PROBLEMS OF ADMINISTERING FLORIDA'S RESOURCES. Fla. Nat. 29(3): 81-87, 2 figs. July 1956.

The authors point out 9 important conservation and development problems of Fla. They claim that the state agencies concerned with resources overlap in functions and are subject to waste, confusion, petty jealousies, and political interference. Present organizational structure is shown in chart. The authors urge creation of a single, integrated department of natural resources. Related proposals are also made.

Smith, H. V. THE CLIMATE OF ARIZONA. Agr. Exp. Sta. (Tucson) Bul. 279. 99 p., illus. 1956. [From Monthly Checklist of State Publ. 47(12).]

Thomas, Wm. L., Jr., editor. MAN'S ROLE IN CHANGING THE FACE OF THE EARTH. U. Chicago Press, Chicago 37, Ill. 1193 p., illus. 1956. $12.50. [From long review by E. H. Graham, J. Soil & Water Cons. 11(5).]

"It contains a collection of more than 50 illustrated articles by as many authors together with a transcription of the discussion which centered around their presentation. These persons, from all parts of the world, met in June of last summer at Princeton to participate in an international symposium on the subject of the volume...this new volume takes the broad view of man and nature, and treats many aspects of what has happened and what is happening to the earth under man's influence. There are introductory papers on the effects of ancient peoples on their environment. A section of the book deals with alterations of climate, soil changes, and biotic modifications in the human habitat. There are presentations on the ecology of wastes, urban-industrial demands for land, and the limitations of man and the earth. But any noting of subjects gives little clue to the varied and informative contents of the book. Many of the authors are new to American readers in the conservation field, and some of the papers will seem overly philosophical or scholastic to many of us. But the book is guaranteed to give the reader a great deal that is new to him, and can scarcely fail to provide stimulation for relating his own knowledge and experience to aspects of conservation in other fields."

Titus, Harold. (Rt. 1, Traverse City, Mich.) LET'S TAKE THE OUTDOORS OUT OF POLITICS. Field & Stream 61(3): 35-37, 116-117, 2 photos. July 1956.

18 national, nongovernmental, conservation organizations were asked to list the policies of renewable resource management to which any government administration should be expected to subscribe. The following points were agreed to by all 18 groups: 1. The integrity of public-land areas must be maintained. 2. Long-range management policies for public lands should be formulated and made effective immediately. 3. The aim of management must be the realization of the land's greatest value for the people as a whole. 4. There must be greatly increased emphasis on small-watershed management immediately. 5. All subsidies for drainage of swamps or marsh areas should immediately be discontinued. 6. Research at the Federal level into all phases of resource conservation should be stepped up. 7. Finally, a Federal review board of qualified, trained people, associated with no other public agency, should be established to implement this program at once. These points are discussed and the organizations that agreed to them are named.

SOILS

Brensing, O. H., and others. SOIL SURVEY OF NOBLE COUNTY, OKLAHOMA. US Soil Cons. Serv., Ser. 1941, no. 16. 67 p., illus. + large folding maps. Sept. 1956. $3.25 from Supt. Documents.

Tarrant, Robert F. (Pac. NW. For. & Range Exp. Sta., Portland, Ore.) EFFECTS OF SLASH BURNING ON SOME SOILS OF THE DOUGLAS-FIR REGION. Soil Sci. Soc. Am. Proc. 20(3): 408-411, 1 fig. July 1956.

CONSERVATION EDUCATION

CONCEPTS OF CONSERVATION: A GUIDE TO DISCUSSION. Cons. Found., 30 E. 40th St., N. Y. 48 p. 1956. [From review by Bernard Frank, J. Soil & Water Cons. 11(5).]

"'Why is this resource vital to our prosperity? How critical is the situation with respect to supply in view of demand? What major factors are involved in its optimum use?' Concepts of Conservation is admirably designed to help interested citizens work out sound answers to such basic queries. The Guide concentrates on four major fields: fresh water supplies, agricultural lands, forest resources and management, and animal life--all involving lively, controversial, and often perplexing issues. Emphasizing the interrelatedness of all resources and our dependence on them, the Guide summarizes the status and trends in each field, suggests fruitful topics for study, and lists references and other educational materials for those wishing more details..."

Hanselman, David Lee. (Cornell U.) A HIGH SCHOOL CONSERVATION ASSEMBLY PROGRAM. Trans. 21st N. Am. Wildl. Conf. p. 607-616, 5 photos. 1956.

With the increasing need for conservation education, we are recognizing the importance of starting this training with youth. In an experimental effort to stimulate the teaching of conservation in the public schools, I devised a 45-minute conservation-education assembly program. During the fall of 1955, 57 schools were visited. Magic and other attention-getters were used consistently. The paper tells how the program was developed and how it was received.--Author.

Myers, Seth L. (Sharon, Pa.) EDUCATIONAL PROGRAMS OF NATIONAL ORGANIZATIONS. Trans. 21st N. Am. Wildl. Conf. p. 580-583. 1956.

"I think that one of conservation's worst enemies has been the jockeying of organizations for recognition, and unless we are able to work together, we may expect more upsets... When I suggest that our conservation education program needs improvement, I'm referring to the actual 'putting across of the authentic data,' which is needed to overcome a constant flow of misinformation emanating from questionable sources... Another practice which causes confusion about wildlife management is the premature reporting of untried ideas, theories and resolutions."

Severy, J. W., and W. L. Pengelly. (Mont. State U.) MONTANA'S VENTURE IN WILDLIFE EXTENSION. Trans. 21st N. Am. Wildl. Conf. p. 595-601. 1956.

Montana seems to have one of the most dynamic and immediately successful programs for educating the public on wildlife problems. Personnel of state universities are financed by the Fish & Game Department to address series of forums in community after community. Basic ecology of problems is taught. Speakers attempt to avoid taking sides on local problems, but they do take stands on policy and principles. Many visual aids are used. Concrete results are apparent in improved public attitudes on difficult or controversial matters.

Shomon, J. J. (Va. Comm. Game.) INTER-AGENCY COOPERATION--KEY TO CONSERVATION EDUCATION SUCCESS. Trans. 21st N. Am. Wildl. Conf. p. 575-580. 1956.

Conservation education to be realistic should be planned as a coordinated statewide enterprise involving resource and educational agencies, key staff members interested in conservation education, and certain representatives of conservation groups. The development of a functional and effective program should be a cooperative enterprise. Its prerequisites should include: a unified approach to resource use education as man understands the unity of all living things, strong inter-agency collaboration between groups--government and private--dedicated to conservation, strong leadership in conservation education without domination, cooperation at all levels of learning, and widespread participation by communities and groups. This paper explains the organization and purpose of the Virginia Resource Education Council, a voluntary group of conservationists and educators, and its 2 major accomplishments in 3 years' time: preparation and publication of a resource conservation booklet and the sponsorship of teacher workshops in conservation training. Cited as other striking examples of statewide inter-agency cooperation are: the statewide annual conservation essay contest sponsored by the Commission of Game and Inland Fisheries and the Virginia Division of the Izaak Walton League of America; the Virginia Plan, a model cooperative agreement between the U. S. Forest Service and the Virginia Game Commission providing joint funds for game and fish improvement; and the Lynchburg Project, which helped establish a $5,000,000 sewage disposal plant for the City of Lynchburg.--Author.

Short, A. W. (220 Parsons Ave., Columbus, O.) CONSERVATION EDUCATION ACTIVITIES OF THE YOUTH GROUPS OF OHIO. Trans. 21st N. Am. Wildl. Conf. p. 584-594. 1956.

Problems, facts, objectives and results of work with Future Farmers covering period Sept. 1, 1951 to Sept. 1, 1955. The projects--how set up, who pays for them, who cooperates in getting job done.--Author.

Various authors. THE COMMUNITY OF LIVING THINGS: IN FIELD AND MEADOW, IN FRESH AND SALT WATER, IN CITY PARKS AND HOME GARDENS, IN FOREST AND WOODLAND, IN THE DESERT. Creative Educ. Soc., Mankato, Minn. Five vols., each about 185 p., illus. 1956. Each $6.95, set $34.95. [From review by Monica de la Salle, Aud. Mag. 58(6).]

Every pair of pages of these 11-1/4 x 8-1/2-inch volumes has "a black-and-white photograph and a facing page of well-printed text. Plants, flowers, insects, amphibians, fishes, birds, and mammals for each habitat are represented, with special stress on the balance of nature and the interdependence of living things. The entire set is therefore an excellent introduction to nature for both children and adults. The 'stories' are easy and interesting reading and the pictures are beautiful."

Wade, Douglas E., Harold M. Steele and Gordon H. Brown. (Box 303, Columbia, S. C.) A METHOD OF TEACHING WATERFOWL IDENTIFICATION. Trans. 21st N. Am. Wildl. Conf. p. 602-607. 1956.

This method was developed over the past 4 years in S. C., originally to instruct wildlife enforcement officers. Kodachrome slides and films showing identification features and birds in nature, and mounted wings and specimens were primary instructional materials. Other audio-visual aids, including tape recordings of waterfowl sounds and talks by experts in management, rounded out the method. The value of testing prior to instruction is emphasized. Testing has additional value in getting immediate group participation. The entire instructional program is predicated on an approach that "any creature is most truly identified alive and in the wholeness of its natural environment." Based on such an approach, a hoped for end-result is "enlargement of the individual's or group's ecological conscience." The method is applicable to other groups of wild animals and adaptable to various age levels, as well as to television.--D. E. Wade.

Wagar, J. V. K., and H. W. Steinhoff. (Colo. A & M Coll.) OFTEN OVERLOOKED FOUNDATIONS OF CONSERVATION EDUCATION. Trans. 21st N. Am. Wildl. Conf. p. 567-574. 1956.

Definite founding laws and written policy statements are important to all conservation agencies. Conventions between nations and cooperative agreements between agencies also define objectives. The Forest Service and National Park Service have had these. Game and Fish agencies often lack one or more and have suffered because of it. Western states likewise are tormented by obsolete water laws which do not recognize wildlife or recreation as "beneficial use." These give undoubted advantage to people they favor, but are based on the thinking and assumptions of previous centuries. We should attain a framework of laws and reasoned policies to guide our conservation activities and education, so we can train better professional men and will have fewer ignorant citizens leading us astray with unguided whims. Laws and statements are not enough. We need professional men to interpret, mold, and administer them. Professional training in conservation should include an intimate knowledge of these laws and policies. We do not imply lack of change. As conservation needs change, so should laws and policies. But they should always be well thought out by men of professional ability and always clearly, simply, and indelibly written and interpreted for all to follow.--H. W. Steinhoff.

BIBLIOGRAPHIES, DIRECTORIES, BIOGRAPHY, HISTORY

Brandborg, Stewart M., compiler. THE CONSERVATION DIRECTORY / A LISTING OF ORGANIZATIONS AND OFFICIALS CONCERNED WITH THE PROTECTION OF WILDLIFE AND OTHER NATURAL RESOURCES. Natl. Wildl. Fed. (232 Carroll St., NW., Wash. 12, D. C.) vii + 96 p. July 1956. 40¢.

Larger and more complete version of this useful, annually revised directory. A good place to get names and addresses of official and private conservation organizations and their major administrators. The booklet is organized by nations, states and provinces of N. Am. and by nations of Latin Am.

Cutright, Paul Russell. THEODORE ROOSEVELT THE NATURALIST. Harper & Bros., N. Y. 297 p., illus. 1956. $4.00. [From review by Monica de la Salle, Aud. Mag. 58(6).]

"Much has, of course, been written about his hunting and collecting expeditions and about the conservation program which many consider the major achievement of his presidency, but a biography treating in detail this aspect of his personality has been long overdue. From his boyhood bird-watching days up to the last letter he ever wrote...natural history absorbed his continual attention and much of his extraordinary energy."

McKelvey, Susan D. BOTANICAL EXPLORATION OF THE TRANS-MISSISSIPPI WEST, 1790-1850. Arnold Arboretum, Jamaica Plains, Mass. xl + 1144 p., maps. 1955. $25. [From review by Joseph Ewan, Sci. Monthly 84(3).]

"Museums and workers in natural history, in both botanical and zoological fields, will find the book of constant reference value. Nor will they be disappointed for the finer points of documentation and careful quotation. The excellent maps, nine in the text and two large folding maps in the pocket, carry the routes and place names associated with the various explorers... ...for the historically minded biologist, Susan McKelvey's opus is thick and rich. As a compendium of our knowledge of the lives and travels of botanical explorers (who were often also engaged in collecting insects, birds, or other 'natural curiosities') this book '...is not a dull enumeration of facts. It might also be compared to the best type of fiction, were it not better still, were it not reality.'"

Stratton, G. Burder, editor. THE ZOOLOGICAL RECORD, VOLUME THE NINETIETH, BEING THE RECORDS OF ZOOLOGICAL LITERATURE RELATING CHIEFLY TO THE YEAR 1953. Zool. Soc. London. 1956. $19.20.

This is probably the most useful bibliographic series in zoology. Wildlife workers can find a great deal of value in it, especially in the sections on birds and mammals. Each section is separately paged, cross-indexed, and may be purchased separately.

PLANTS--GENERAL, ECOLOGY, TECHNIQUES

Küchler, A. W. (U. Kans.) CLASSIFICATION AND PURPOSE IN VEGETATION MAPS. Geog. Rev. 46(2): 155-167 + 3 separate maps. Apr. 1956.

Discusses some of the possible types of vegetation maps, presents concrete examples of 3 important types, and compares these 3 to show that each has advantages for special purposes. The 3 types are physiognomic, floristic, and physiognomic-floristic.

PLANTS--FLORAS, COMMUNITIES, TAXONOMY

Baker, William H. (U. Idaho.) PLANTS OF IRON MOUNTAIN, ROGUE RIVER RANGE, OREGON. Am. Midl. Nat. 56(1): 1-53, 14 figs. July 1956.

Discussion of the area and its life zones and floristic affinities; concise key to all categories; annotated list of species with data on occurrence, habitat, and zone.

Cormack, R. G. H. (U. Alberta, Edmonton.) SPRUCE-FIR CLIMAX VEGETATION IN SOUTHWESTERN ALBERTA. For. Chron. 42(3): 346-349. Sept. 1956.

Successional relationships of ground vegetation. "A small number of 'key' plants selected from almost every plant group is shown to be correlated with mature spruce and fir and to delimit sharply this climax stage of coniferous forest succession from all earlier stages. The stability of spruce-fir stands is briefly discussed."

PLANTS--FLORAS, COMMUNITIES, TAXONOMY--Continued

Correll, Donovan S. FERNS AND FERN ALLIES OF TEXAS. Texas Res. Found., Renner, Texas. 188 p., illus. 1956. $5.50. [From A. I. B. S. Bul. 7(1).]
"Among the forty-eight states, the 107 species of ferns in Texas are only exceeded by the 120 found in Florida."

Graves, Arthur H. ILLUSTRATED GUIDE TO TREES AND SHRUBS: A HANDBOOK OF THE WOODY PLANTS OF THE NORTHEASTERN UNITED STATES AND ADJACENT REGIONS. 2d edition. Harper & Bros., N. Y. 271 p., illus. 1956. $6.00. [From review by Amy Clampitt, Aud. Mag. 58(5).]
"This is a revision of a book first published in 1952. A winter key has been added, as well as several new species, and there have been some changes in nomenclature. For those who wish to pin down the identity of the so often perplexing woody plants but who find the standard botanical manuals confusing, this guide is highly recommended. Technical descriptions are given in condensed form, and are supplemented by useful suggestions for distinguishing families and genera. The illustrations... are unusually handsome as well as detailed, and make the book a pleasure to consult. Generally the leaf, bud, and branchlet are shown, occasionally with flower or fruit as well."

Jordal, Louis H. A FLORISTIC AND PHYTOGEOGRAPHIC SURVEY OF THE VEGETATION ON THE SOUTHERN SLOPES OF THE BROOKS RANGE, ALASKA. "A REPORT SUBMITTED TO THE ARCTIC INSTITUTE OF NORTH AMERICA IN FULLFILMENT OF CONTRACTED OBLIGATIONS." ii + 428 p., 10 pls., 16 photos. 1951. (Bound, typed, ribbon copy in US Dept. Interior Library.)
Although of chief interest to taxonomic and phytogeographic botanists, this volume should be of value to other biologists concerned with the region. The main sections take up: geographical and botanical exploration in the Brooks Range, geography and physiography, geology and palaeogeography, glaciation and its effects, palaeoclimatic changes in n. Alaska, present climate in Brooks Range, list of plants with great amounts of information on taxonomy, list of specimens and localities for them, and detailed discussion of phytogeographic affinities of the region. Long bibliography.

Ritchie, J. C. (U. Manitoba, Winnipeg.) THE VEGETATION OF NORTHERN MANITOBA. I. STUDIES IN THE SOUTHERN SPRUCE FOREST ZONE. Can. J. Bot. 34(4): 523-561, illus. July 1956.
Describes the environment and the plant communities. Black spruce forms the predominant forest of mesic sites and covers 2/3 of area studied. Jack pine is a seral dominant of mesic sites and is dominant in dry forests on outcrop ridges, sand plains, and eskers. White spruce and paper birch are rare. Muskeg (1/5 of area studied), peat bog, and lake vegetation are the communities of wet sites.--Neil Hotchkiss.

PLANTS--FOREST SURVEYS

Gedney, Donald R., and Carl E. Mayer. FOREST STATISTICS FOR HOOD RIVER COUNTY, OREGON. US For. Serv., Pac. NW. For. & Range Exp. Sta. (Portland, Ore.), For. Surv. Rep. no. 125. ii + 28 p., map & graphs. Sept. 1956.
Area, stocking, timber volumes, ownership, annual cut. Consists mainly of tables with summarizing text.

Hutchison, O. Keith. INDIANA'S FOREST RESOURCES AND INDUSTRIES. US Dept. Agr., For. Resource Rep. no. 10. iii + 44 p., 37 figs. Aug. 1956.
Data are discussed simply and presented in tables. Ind. has 4.1 million acres of woodland, of which 1.7 million are grazed. Most of the forest is in the s. part of Ind. and most is privately owned. 99% of the stock is hardwood. Stands are generally understocked and of poor quality. Only about half the annual sawtimber growth is harvested, but quality continues to decline because best trees are taken and poor ones are left to grow. There is great need for understanding and adoption of sound forestry practices.

Larson, Robert W. HARDWOOD TIMBER RESOURCES IN CENTRAL AND NORTHERN GEORGIA. US For. Serv., SE. For. Exp. Sta. (Asheville, N. C.), Sta. Pap. no. 70. 48 p., 32 figs. Sept. 1956.
The chief problem is how to dispose of a great volume of unmerchantable hardwoods so that more valuable ones may grow.

PLANTS--FOREST SURVEYS--Continued

Minnesota. THE FOREST RESOURCE OF COOK COUNTY. Office of Iron Range Resources and Rehabilitation, 624 State Office Bldg., St. Paul 1, Minn. 1-61 p., 15 figs. 1955 [1956].

Area and ownership, timber volumes, rate of cutting, industries, growth, allowable cut, management problems, opportunities for better management.

Morgan, J. T., and L. F. Compton. IOWA FOREST STATISTICS. US For. Serv., Cent. States For. Exp. Sta. (Columbus, Ohio), For. Surv. Rel. 20. iii + 58 p., illus. July 1956.

Preliminary report on forest areas and timber volumes.

Sternitzke, Herbert S. TIMBER SUPPLIES FOR INDUSTRY IN ARKANSAS. US Dept. Agr., For. Resource Rep. no. 11. iii + 32, 25 figs. 1956. 30¢ from Supt. Documents.

Forests cover nearly 60% of the state. Proportion of commercial forest is highest--71%--in the southwest. Least amount of forest--37%--remains in the Delta. Timber now appears to be growing faster than it is being cut, but total volume is less than in 1935 and trees av. smaller in size. Large pines have been cut heavily. Small and cull hardwoods have increased. Public forests and large industrial forests are being well managed, with good degree of productivity and good utilization of the cut. Much improvement is still needed on small holdings that constitute the bulk of the commercial forestland. Statistical data are presented in graphs and tables.

U. S. Forest Service. PEOPLE AND TIMBER...A REVIEW OF AMERICA'S TIMBER RESOURCES. US Dept. Agr., Misc. Publ. no. 721. 16 unnumbered p., illus. June 1956. 20¢ from Supt. Documents.

Popular review of present status and future needs. Cutting still is far ahead of growth in the West. Growth is ahead of cut in the East, especially in hardwoods. A large part of the hardwood volume, however, is in culls. Nationwide, timber quality still seems to be decreasing. Public forests and large commercial forests are relatively well managed. The great opportunity for improvement is in the thousands of small timber holdings that constitute 60% of our timberlands--about 1 out of 10 Am. families owns some woodland. Forestland is about 25% of the nation's acreage, but about a quarter of it is poorly stocked or not stocked at all. Most understocking is in the East. Much more planting is needed here. Insects, fire, disease and the like destroy wood equal to more than 1/4 of the annual growth. About 1/4 of the timber cut is not utilized in any way. Consumption of wood is at an all-time high and by the year 2000 the demand is likely to be twice as great as it is today. Little of the demand can be met by imports. The real key to our future timber supply lies in the hands of the owners of our multitudes of small, private woodlands.

WILDLIFE--NEW GAME SERIES

C.S.I.R.O. Wildlife Research. Vol. 1 no. 1, 72 p., illus. Sept. 1956. Published intermittently, as material becomes available, by Commonwealth Scientific and Industrial Research Organization, 314 Albert Street, East Melbourne, C. 2, Victoria, Australia. 10s. per issue.

A well-printed journal, equivalent to our J. Wildl. Mgt., issued by the C.S.I.R.O. "as a medium for the publication of the results of the research of its Wildlife Survey Section, mainly on mammal and bird ecology, control, and conservation, and cognate subjects." Longer papers of first issue are: A live-trapping study of the brush-tailed possum Trichosurus vulpecula Kerr (Marsupialia). A survey of endoparasites of the wild rabbit, Oryctolagus cuniculus (L.) in Australia. The Australian bird-banding scheme. First annual report of the Australian bird-banding scheme, October 1953 to June 1955. Individual marking of the rabbit Oryctolagus cuniculus (L.). Methods of sampling winged insects feeding on the rabbit Oryctolagus cuniculus (L.). Plastic collars with patterns of reflective tape for marking nocturnal mammals. Chloral hydrate narcosis for the live capture of mammals. Shorter papers are on growth rate of young rabbits, common tern banded in Sweden and recovered in Australia, the little corella and rice cultivation, and first recoveries in N. Hemisphere of Tasmanian mutton bird banded in Australia.

WILDLIFE--NEW GAME SERIES--Continued

DELAWARE CONSERVATIONIST. Published quarterly by Board of Game & Fish Commissioners, Dover, Del. Vol. 1, no. 1, 16 p., illus. Winter 1956.
This new state fish and game journal is a well printed and well illustrated booklet of 9 x 6 inches. It is designed primarily to inform sportsmen, to provide conservation education, and to report on departmental matters. The first issue has a short article on history and management of deer in Delaware, a brief paper on results obtained by organized sportsmen of the state, the fiscal report of the department for the year ended June 1956, and a table of game kills reported in 1954.

VILTREVY / JAKTBIOLOGISK TIDSKRIFT UTGIVEN AV SVENSKA JÄGAREFÖRBUNDET. Publ. by Svenska Jägareförbundets, Jakobsbergsgatan 8, Stockholm C, Sweden. Band 1 Häfte 1, 128 p., illus. Dec. 1955. Price kr. 5:50.
Another new European game research journal. It is a well-printed publication of about 9 x 6 inches and is well illustrated with graphs, maps and photos. Papers have long summaries in English and German. The first paper is "Body temperature, activity and reproduction of the capercailzie," by Nils H. Höglund. The second paper, by Karl Borg, reports on the use of chloralose for control of avian pests. A final, shorter paper by Nils H. Höglund, is "Influence of different colours on the capercailzie chicks choice of food."

WILDLIFE--BIOTAS, ECOLOGY, NATURAL HISTORY

Baird, James. THE ECOLOGY OF THE WATCHUNG RESERVATION, UNION COUNTY, NEW JERSEY / A DESCRIPTION OF THE BIOTIC COMMUNITIES AND RECOMMENDATIONS FOR THEIR MANAGEMENT PREPARED AT THE REQUEST OF THE UNION COUNTY PARK COMMISSION. Dept. Botany, Rutgers U., New Brunswick, N. J. 1-83 p., 10 figs. 1956. $1.50.
The reservation is 2000 acres of fields and forests in the midst of urban developments. It is used for recreation but much is kept as a diversified natural area. Such uses tend to conflict and guide-lines were needed by the Park Commission. Many areas present similar problems; their administrators, and biologists interested in the areas, should find helpful ideas in this study. The author studied past conditions, described present plant communities, and made detailed recommendations designed for continuation of natural communities and some expansion and regulation of recreation. Recommendations include, among many other things, suggestions for wise use of herbicides and insecticides, control of honeysuckle, maintenance of seral stages, and handling of specific tracts. The book also presents lists of birds by habitats, annotated lists of birds and mammals, and lists of reptiles and amphibians. Deer are the only vertebrates for which control may be needed, and since there are only about 25 deer, control by trapping is suggested.

Buxton, P. A. ANIMAL LIFE IN DESERTS. St. Martin's Press, N. Y. xv + 176 p., 43 figs. 1923, reprinted 1955. $4.25. [From review by D. F. Hoffmeister, Ecol. 37(4).]
"When Buxton's account of the desert 'fauna in relation to the environment' was originally published in 1923, it provided a valuable summary up to that time of conditions in deserts throughout much of the world. The book summarized some of the similarities and differences in desert life and desert climates in the Palearctic, Nearctic, Ethiopian, and Oriental regions. It emphasized the adaptations which enable animals to live in areas of extreme drought, heat, evaporation, and wind. Since 1923, so much more has been learned about the biota of our deserts and the responses of animals to desert conditions, especially here in North America, that many statements in Buxton's book, now reprinted but unchanged, seem far out-of-date... This volume still serves as the main summary of desert life and conditions throughout the world..."

Childs, Henry E., Jr., and Walter E. Howard. (Compton Jr. Coll., Calif.) THE VERTEBRATE FAUNA OF THE SAN JOAQUIN EXPERIMENTAL RANGE. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), Misc. Pap. no. 19. ii + 20 p., proc. Feb. 1955.
Annotated list of amphibians, reptiles, mammals, and birds. Annotations are short and pertain chiefly to status and habitat. The Range is in Madera Co., Calif.

Gillham, Mary E. (U. of Exeter, Eng.) ECOLOGY OF THE PEMBROKESHIRE ISLANDS. V. MANURING BY THE COLONIAL SEABIRDS AND MAMMALS, WITH A NOTE ON SEED DISTRIBUTION BY GULLS. J. Ecol. 44(2): 429-454, 6 figs. July 1956.

Hanson, Harold C., Paul Queneau, and Peter Scott. (Ill. Nat. Hist. Surv., Urbana.) THE GEOGRAPHY, BIRDS, AND MAMMALS OF THE PERRY RIVER REGION. Arctic Inst. N. Am. (1530 P St. NW., Wash. 5, D. C.), Spec. Publ. no. 3. 1-96 p., 34 figs. Feb. 1956. $2.00.

Discusses characteristics and Eskimo of this region of n. Canada and presents annotated lists of birds and mammals as well as short lists of rocks, fishes, and insects. Bird and mammal sections are detailed, with information on taxonomy, foods, parasites, productivity, and behavior of many species. Waterfowl were a chief objective of the expedition. There are good discussions of Canada goose, black brant, Am. white-fronted goose, blue goose, lesser snow goose, Ross's goose, pintail, old-squaw, and king eider. The long section on status and biology of Ross's goose is especially significant. The section on rock ptarmigan is also worthy of mention. Data on mammals are less extensive but include information on abundance, taxonomy, measurements, reproduction, and parasites.

Krutch, Joseph Wood. THE VOICE OF THE DESERT. Wm. Sloane Associates, N. Y. 233 p., illus. 1955. $3.75. [From long review by Frank E. Egler, Ecol. 37(4).] As a naturalist's regional report, "it is a valued addition to that literature, showing a remarkably sensitive comprehension, not only of the individual plants and animals but of their integration... There are separate chapters on: climatology and geomorphology, the spadefoot toad and the roadrunner, the saguaro, the Cactaceae, the scorpion, the yucca and its moth, the kangaroo rat, naturalized species, adaptations to water shortage, altitudinal zonation, and sex... Throughout these pages the author shows a firm and more than adequate grasp of the scientific literature. Furthermore, he supplements this knowledge with simple but effective personal experiments." But even more than in its factual material, the significance of the book lies in the author's search for cause and purpose. His chapter "Conservation is not enough," questions whether even good conservation is good enough in the long run. "'Ultimately we may have to recognize that there is also a conflict between what is called the general good [of humanity] and a good still more general--the good...of the whole biological community.' 'To live healthily and successfully on the land we must also live with it.' '...to some extent [therefore] the immediate interest of the human species may sometimes have to be disregarded.'"

Wing, Leonard W. A REPORT ON A STUDY OF ARCTIC BIRDS & MAMMALS. Typewritten report to Arctic Inst. N. Am. 88 p. + 12 p. of figs. 1948. Bound ribbon copy in US Dept. Int. Library.

Work was done in Yukon Territory at Johnson's Crossing of Teslin R. in summer of 1948. Mammals were too scarce for many data on them to be obtained. The paper contains: weather data; an account of bird activities in relation to weather and light; data and discussions on ecological distribution of birds, bird populations, and bird flocks; a musicological study of bird songs; and an analysis of long-term records of freezing and thawing dates of various northern rivers, with consideration of climatological conclusions that may be drawn from this analysis. The chief conclusion of this section is that the rivers have been remaining unfrozen for longer periods to an extent that would indicate a northward march of climate of about 75 to 85 miles a century.

WILDLIFE--NATURAL AREAS & REFUGES

McKay, Douglas. THE TRUTH ABOUT OUR WILDLIFE REFUGES. Sports Afield 135(5): 156-158, 160, 162, 164, 166. May 1956.

Oil leases and other matters pertaining to federal refuges have been debated so hotly that this detailed statement by the former Secretary of the Interior is of real reference significance. It explains the safeguards under which leases are granted, the authority that the Fish & Wildlife Service has in connection with them, the legal status of refuges in respect to commercial developments, policies followed by the author, and related matters. A rebuttal by Michael Hudoba appears on pages 32, 34, and 35 of the same issue. Both writers state their positions strongly.

Various authors. NATIONAL FOREST WILDERNESS IN COLORADO AND UTAH. Living Wilderness 21(57): 10-20, 13 maps. Summer 1956.
Brief descriptions of 11 wilderness areas in Colo. and 1 in Utah. Means of access, major animals, and sources of further information are mentioned. The 12 areas total 1,049,499 acres. The authors are personnel of the forests involved.

Wells, George, and Iris Wells. THE HANDBOOK OF WILDERNESS TRAVEL. Harper & Bros., 49 E. 33d St., N. Y. 16, N. Y. x + 306 p., 1 map. 1956. $4.00.
If you want to get away from civilization, this book tells you where and how. State by state, the best wild areas are described and information is given on just what maps and other sources of data are available. Nearly every state has at least a few stretches of stream where a canoeist or float-boater will see few signs of development, or has rough, wooded regions that can be entered best by back-packing or pack-horse trips. Other states have vast tracts of mountains, deserts, swamps, or lonely islands. They will tempt you from every page of this book. Probably you will learn of some that are closer than you think, for the authors have tried to select areas in every part of the U. S. These discussions of areas, 371 of them, constitute most of the book. Good chapters give instructions and lists of food and equipment for back-packing, and give practical suggestions for pack trips, burro trips, organized wilderness trips, canoe and cruiser travel, float trips, etc. As the authors are not writing for purists alone, they tell of the advantages of travel by marsh buggy or airboat in great marshes and swamps and by jeep in the deserts. One chapter is devoted to the great organized trails such as the Pacific Crest Trailway. The book appeals to the reviewer as practical, helpful and realistic. Mileages and difficulties of trails are stated and the best season for each is pointed out. Descriptions of canoe trips specify obstacles present and degree of skill required. Also important: the reader realizes that wilderness today is no accident and that it can remain wild only with care.

WILDLIFE--NATURE PROTECTION & RARE & EXTINCT SPECIES

Amon, R. (Ballhausgasse 3/2, Graz, Austria.) HISTORY OF EXTIRPATION OF LARGE CARNIVORES IN THE EAST ALPS AND THE POSSIBILITY OF THEIR RESTORATION. Z. Jagdwissensch. 2(4): 209-216, 1 map. 1956.
In German. English summary: "The big carnivores like bear, lynx, wild cat, and wolf, exterminated during the last centuries, are able to settle again in the autochthonous areas of distribution in the Eastern Alps by means of natural immigration. Conditions for their resettlement are supposed to be measures for shooting prohibitions and for shooting self-control."

Baker, Rollin H. (Mich. State U.) REMARKS ON THE FORMER DISTRIBUTION OF ANIMALS IN EASTERN TEXAS. Texas J. Sci. 8(3): 356-359. Sept. 1956.
Notes on former occurrence or status of scissortail kite, passenger pigeon, Carolina paraquet, ivory-billed woodpecker, beaver, black bear, ocelot, and puma.

Serventy, D. L., and others. THE RECENT INCREASE OF THE RARER NATIVE MAMMALS. W. Australian Nat. (Perth) 4(6): 128-141. Sept. 1954. [From J. Mamm. 37(4).]

Various Authors. PROTECTION OF ARCTIC ANIMALS. Internat. Union Prot. Nat., (rue Vautier 31, Brussels, Belg.) Proc. & Pap. 5th Tech. Meeting, Copenhagen, 1954. p. 55-84. 1956.
Ten concise papers and a summary of them discuss conservation problems of animals of the Far North. These papers are: General Report [summary], by R. Spärck [23 Sortedam Dossering, Copenhagen, Den.]. The status of the Atlantic walrus, Odobenus rosmarus (L.), in Canada, by M. J. Dunbar [Arctic Inst. N. Am., Montreal, Can.]. The hood seal (Cystophora cristata), by H. R. Lillie [c/o Bank of Scotland, Reform St., Dundee, Scot.]. Proposed bird preservation in Greenland, by Finn Salomonsen [Zool. Mus., Copenhagen, Den.]. Arctic vertebrates threatened with extinction in Sweden, by Kai Curry-Lindahl [Zool. Garden, Stockholm, Sweden]. The management of barren-ground caribou in Canada, by A. W. F. Banfield [Can. Wildl. Serv., Ottawa]. Factors affecting the status

of the polar bear (Thalarctos maritimus) in Canada, an interim report, by Richard Glover [235 Kingsway, Winnipeg, Can.]. Reindeer in Greenland, by C. Vibe [Zool. Mus., Copenhagen, Den.]. Proposed protection of the dark-breasted brent goose, Branta bernicla bernicla L. by Finn Salomonsen [Zool. Mus., Copenhagen, Den.]. The walrus west of Greenland, by C. Vibe [Zool. Mus., Copenhagen, Den.]. Some remarks on the status of the polar bear (Thalarctos maritimus) in Greenland, by R. SpHrck [23 Sortedam Dossering, Copenhagen, Den.].

WILDLIFE--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Coombs, C. J. F., and A. J. Marshall. THE EFFECTS OF HYPOPHYSECTOMY ON THE INTERNAL TESTIS RHYTHM IN MAMMALS AND BIRDS. J. Endocrin. 13: 107-111. 1956. [From authors' summary in Ibis 98(3).]

Hammel, H. T. (U. Pa. Sch. Med., Phil. 4.) INFRARED EMISSIVITIES OF SOME ARCTIC FAUNA. J. Mamm. 37(3): 375-378, 1 fig. Aug. 1956.

Pelts of 12 Alaskan mammals and 1 bird were tested to see if they were adapted to prevent loss of heat through radiation. Results were negative. "The total infrared emissivities of ten species of Arctic fauna were found to be like that of a perfect black body radiator." Certain habits of arctic animals, however, apparently serve to reduce radiation of heat.

Hediger, H. STUDIES OF THE PSYCHOLOGY AND BEHAVIOR OF CAPTIVE ANIMALS IN ZOOS AND CIRCUSES. Butterworths Sci. Publs., London, W.C.2. vii + 166 p., photo plates. 1955. 30s.

Hediger is an exceptionally perceptive, stimulating student of animal behavior. He has carried his studies into the wild in numerous parts of the world. Here he brings together many of his own observations, interpretations, and ideas, and combines them with data from a wide literature, much of it unfamiliar to Americans. The book has been criticized as anecdotal; this very quality makes it enjoyable and concrete--the few abstract and academic sections are the driest. Furthermore, behaviour of many of the species Hediger discusses has not been studied systematically in the laboratory and has to be presented more or less anecdotally, with interpretations understood to be personal. The book is not only good reading for anyone interested in animal behavior--it has plenty of facts and ideas worthy of consideration by animal psychologists. Mammals receive most attention, birds and reptiles less. Subject matter is highly diverse. Especially recommended to wildlife biologists is Hediger's discussion of flight distance and its extensive ramifications. A few of the other topics are sleep and dreams, features of an individual's range, daily routine, adaptations for escape, animal "hypnosis," social relationships, birth and care of young, psychological factors in domestication, animal training and its psychological bases, play, expression of emotions, and the "Clever Hans error." The bibliography has nearly 200 titles, most of them in German.

Jones, I. Chester, and P. Eckstein, editors. THE COMPARATIVE ENDOCRINOLOGY OF VERTEBRATES. PART I. THE COMPARATIVE PHYSIOLOGY OF REPRODUCTION AND THE EFFECTS OF SEX HORMONES IN VERTEBRATES. Mem. Soc. Endocrinol., Cambridge U. Press, N. Y. 253 p., 28 figs., 10 pls. 1955. $8.50. [From long, informative review by C. L. Turner, Copeia 1956(4).]

Fourteen papers give much information on the nature of reproduction and physiological control of reproduction in all groups of vertebrates. Some of these papers deal specifically with reproduction in mammals, birds, reptiles, and amphibians. Turner's long review virtually abstracts the individual papers. Of particular interest to mammalogists will be the papers: Reproduction in mammals by S. Zuckerman and P. Eckstein, The evolution of viviparity in vertebrates by L. Harrison Mathews, Vertebrate gonadotropins by E. Witschi, The varying effects of sex hormones in mammals by J. H. Leathem and R. C. Wolf, and Modalities in the action of gonadal and gonad-stimulating hormones in the foetus by H. Jost.

Thorpe, W. H. LEARNING AND INSTINCT IN ANIMALS. Methuen, London. 493 p., 70 figs., 9 pls. 1956. 55s. [From review by D. L., Brit. Birds 49(9).]

"This extremely important book...is intended mainly for zoologists and is almost certainly too specialized, technical and difficult for the general bird-watcher. It is a much needed and timely synthesis of the findings of European observers on wild and captive animals, especially birds, and of American laboratory experiments on rats, etc., in mazes and with puzzles. The book is primarily concerned with learning, using this term in the broadest sense, while instinct is discussed chiefly as a background by which to assess learning. It therefore follows on from N. Tinbergen's Study of Instinct (1951), but whereas the latter included much valuable information from field-ornithologists, the research on learning, even that on wild birds, has been mainly by trained zoologists. The book...assumes a not inconsiderable knowledge of zoological and psychological terms. The first part is theoretical, and probes more deeply than N. Tinbergen's...but at the expense of lucidity. The various theories of instinct and learning are discussed with sound, critical, sympathetic and mature judgment, and the author raises...the complex philosophical problems involved in 'purposiveness' in behavior, and the relationship of subjective to objective knowledge. The remaining two-thirds of the book is a full survey of learning behaviour in the animal kingdom, birds providing nearly half of the information. This section the general ornithologist will find easier... To conclude, this comprehensive, wise and well-balanced, but technical, book should have a great influence on the directions which future research on behaviour will take."

WILDLIFE--EFFECTS OF CHEMICALS, WEATHER, CARS, ETC.

Englert, H. K. (Stefan-Meier-Strasse 22, Freiburg i. Brsg., Germany.) WHAT CAUSES DECLINE OF GAME? DO POISONS AND MODERN SPRAY-MATERIALS PLAY A DECISIVE ROLE? Z. Jagdwissensch. 2(4): 220-226, 4 photos. 1956.

In German. English summary: "The results of an examination of 384 pieces of fallen game made in the period from 1950 to 1955 are reported. In 2.6% of all cases poisoning could be proved as the cause of death. These poisonings may be traced back to irresponsible or wrong handling of drugs for the destruction of vermin or to intentional poisoning. Further is reported how a liquid protection against the gnawing of bark by game applied in too strong a dosis caused the falling out of hair and the growing of scurf on the skin of field hares. Experiments with domestic rabbits led to the same symptoms. The cause of death of 191 field hares sent in was proved to be due to an infection in 103 cases, parasitical diseases in 41 cases, and isolated diseases in 47 cases. 1954/55 toxoplasmosis could be stated for the first time as a new infection. The possibilities of the infection of shooting dogs and humans were investigated. The disappearance of young hares in summer is explained by the occurrence of hare epidemics, especially coccidiosis and toxoplasmosis. The cause of the growing extent of hare epidemics is considered to be the lack of larger prey birds in the first line and secondly the deficient supply of hares with life preserving constructive elements."

Montgomery, Mrs. A. E. (329 Sturges Parkway, Elmhurst, Ill.) BIRD MORTALITY IN ELMHURST. Aud. Bul. (Ill.) no. 99: 1-3. Sept. 1956.

Large numbers of elms throughout the city were sprayed with DDT in Apr.-May of 1956 for control of Dutch elm disease. Birds were abundant but most soon disappeared. No living robin remained and dead robins were found in nearly every yard. Great quantities of dead earthworms were seen; birds may have been poisoned by eating them. Fruits normally preferred by birds dried up on the branches for there were few birds left to use them. At least half the cardinals probably were killed. A downy and a red-headed woodpecker are known to have died. Ruby-crowned kinglets died after showing typical DDT symptoms. Perhaps half the English sparrows and starlings of the town were killed. Some warblers, blue jays, Baltimore orioles, and grackles were killed. Long-used wren boxes remained empty.

Nüsslein, F., and E. von Xylander. (Inst. für Jagdkunde, Schlossplatz 3, Hann. Münden, Germany.) OBSERVATIONS ON EFFECT OF TOXAPHEN ON GAME ANIMALS. Z. Jagdwissensch. 2(4): 229-235. 1956.

In German. English summary: "Feeding experiments with pheasants, domestic rabbits, wild boar, and shooting dogs showed that the drug Toxaphen used for killing field voles does not represent any acute danger for a large part of these animals. Symptoms of illness which partly caused the death of the animals could be stated with pheasants and young rabbits. Advice is given for the practical employment of the drug, stating the quantity and the seasons in which it is best to employ Toxaphen."

Rudd, Robert L., and Richard E. Genelly. (U. Calif., Davis.) PESTICIDES: THEIR USE AND TOXICITY IN RELATION TO WILDLIFE. Calif. Dept. Fish & Game, Game Bul. no. 7. 1-209 p. 1956.

The most encyclopedic work on the subject that has appeared. Insecticides, fungicides, fumigants, rodenticides, and herbicides are taken up chemical by chemical. For each important pesticide there are sections on use, toxicology, and effects on all forms of wildlife. Data are drawn from an enormous literature, domestic and foreign, as well as original work, and are presented here as readable digests or syntheses. Facts on use and toxicology are taken from agricultural, veterinary, and human medical sources and thus afford an excellent background for the wildlife information. The book is gratifyingly up-to-date, for several 1956 references are included. Its coverage of foreign literature is also commendable. Bibliography and bibliographic appendix occupy 50 pages. Introductory sections of the monograph take up such subjects as magnitude of pesticide use, factors governing danger to wildlife, and any special problems that require attention. The authors are anything but alarmists; indeed, some rather grave situations are given only matter-of-fact attention. The authors' general conclusions are: "...the extent of wildlife loss from pest control chemicals, considered broadly, is probably not great. Local loss can be serious. In some instances recommended practices need modification to prevent losses over wide areas. Although the over-all loss is not great, any loss is considered significant by some interests. This is true because the primary means of judging the importance of loss are not economic. The rational position is to recognize the need for using control chemicals and insist only that such use be studied and wisely regulated for the best combined interests of all concerned."

Snethlage, K. H. (Forschungsst. für Jagdkunde, Koblenzer Strasse 150, Bonn, Germany.) OBSERVATIONS ON EFFECT OF PLANT-PROTECTION CHEMICALS ON YOUNG PHEASANTS. Z. Jagdwissensch. 2(4): 235-240. 1956.

In German with English summary. Chicks were sprayed or dusted with 6 types of pesticides. The chemicals were metasystox, Bayer nos. 4632 and 4633, 50% DDT, hexadrin, and Pego-Doppelstaub. Rate of application was 800 cubic cm. per ha. for the first 3, 1200 g. per ha. for the next 2, and 20 kg. of dust per ha. for the last. No effect on the birds was observed. The author believes that a single spraying would not endanger young game.

Various authors. EFFECTS OF MODERN INSECTICIDES ON MAMMALS, BIRDS AND INSECTS. Internat. Union Prot. Nat. (rue Vautier 31, Brussels, Belg.), Proc. & Pap. 5th Tech. Meeting, Copenhagen, 1954. p. 86-170. 1956.

A series of papers of varying length that take up direct and indirect effects of the newer pesticides. Some of the unfamiliar foreign examples are especially interesting. All papers not in English have English summaries. Papers are: Rapport général, by J. Lhoste Effets des insecticides sur les vertebres, by R. Houba. Insecticides and nature in the United States, by David G. Hall. Chemical controls in relation to wildlife, by Clarence Cottam. Wildlife in a chemical world, by Joseph P. Linduska. Work in England on effect of insecticides and other chemicals used in plant protection on beneficial insects and insect populations, by M. J. Way, D. G. Glynne-Jones, and C. G. Johnson. Un cas typique de la rupture de l'equilibre biologique par l'emploi inconsidéré d'insecticides, by M. P. Basilewsky. Changes caused by spray chemicals in the fauna of apple orchards in Nova Scotia, by N. A. Patterson. Zur Gesundung und Gesunderhaltung unserer Wälder mittels Vernehrung der kleinen, roten Waldameise (Formica rufa), by K. Gösswald. Le role des "stations-refuges" dans la conservation et la dispersion des insectes phytophages et entomophages, by

P. Grison and E. Biliotti. Désinsectisation et équilibres dans la presqu'île du Cap Vert (Sénégal), by André Villiers. Ist unsere Vogelwelt durch Pflanzenschutzmittel gefährdet und welche Massnahman sind zur Verhütung von Schäden zu empfehlen? by Herbert Bruns. Repercussion sur la faune ornithologique d'un poudrage aerien au H.C.H., by J. Giban and J. Aubry. The possible harmful effects of the wide scale use of crop protection chemicals in the United Kingdom, by Wardley Smith. The effect of economic poisons on wildlife, by L. E. Rosenberg, R. L. Rudd, and R. E. Genelly. The effects of certain insecticides and herbicides on game-birds and other wildlife in farm crops, by A. D. Middleton. Repercussions sur l'apiculture des traitements phytosanitaires, by Jacques Lecomte. Anti-parasitaires et equilibre biologique naturel, by Société "Montecatini," (Milano, Italie). Sur deux nouveaux insecticides selectifs, by J. Lhoste.

Yeager, Lee E. (Colo. A & M Coll.) POISONS AND WILDLIFE / A CONTRIBUTION FROM THE WILSON ORNITHOLOGICAL SOCIETY CONSERVATION COMMITTEE. Wilson Bul. 68(3): 261-264. Sept. 1956.

A general discussion that emphasizes the great quantities of insecticides and herbicides used today, the huge areas and numerous habitats that are being affected by them, and the need for much extended study of their effects on wildlife.

WILDLIFE--PARASITES & DISEASES

Becker, Elery R. (Iowa State Coll.) CATALOG OF EIMERIIDAE IN GENERA OCCURRING IN VERTEBRATES AND NOT REQUIRING INTERMEDIATE HOSTS. Iowa State Coll. J. Sci. 31(1): 85-139. Aug. 1956.

On world basis. Species of 12 genera are listed with reference to original description, size of oocyst or sporocyst, and host. Rejected names are listed with appropriate comments. 537 references are cited.

Farrell, Charles E. (Vanderbilt U.) CHIGGERS OF THE GENUS EUSCHÖNGASTIA (ACARINA: TROMBICULIDAE) IN NORTH AMERICA. Proc. US Natl. Mus. 106: 85-235, 8 figs., 21 pls. 1956.

Taxonomic and to some extent ecological study of an important group of parasites of terrestrial animals.

WILDLIFE--POPULATIONS & FLUCTUATIONS

Cragg, J. B., and N. W. Pirie, editors. THE NUMBERS OF MAN AND ANIMALS. Publ. for Inst. of Biol. by Oliver and Boyd, Edinburgh & London. viii + 152 p. 1955. 15s.

"This book is a record of the symposium held on 24 and 25 September 1954 by the Institute of Biology. Its aim was to bring together specialists in many different subjects connected with the numbers of man and animals in order to discover how much common ground existed and to emphasize the most serious gaps in our knowledge." Consists of the following papers: 1. Economic theory and the concept of an optimum population. 2. The growth of human populations. 3. An anthropologist's approach to population growth: studies in the Bechuanaland Protectorate. 4. The mathematical approach to population dynamics. 5. The mortality factors affecting adult numbers. [See WR 87: 17.] 6. Adverse effects of population density upon the viability of later generations. [See WR 85: 10.] 7. Experimental competition in beetles, with some general implications. [See WR 87: 17.] 8. The relationship between disease control and changes in population growth and age structure. 9. Some biological aspects of population problems. 10. The effects of nutrition on fertility in animal and human populations. [See WR 87: 17.] 11. Pastoralism in relation to populations of men and animals. 12. Changes in the quality of human populations. 13. Human population; the future.--V. Schultz.

Errington, Paul L. (Iowa State Coll.) FACTORS LIMITING HIGHER VERTEBRATE POPULATIONS. Science 124(3216): 304-307. Aug. 17, 1956.

A general discussion of some complex aspects of control factors in higher vertebrates. Three major subjects are discussed: (1) There are dangers in assuming competition between species as the major factor involved in population adjustment, since possibly changes in the ecologic niches of the species may be more important. (2) Territoriality is proposed as a self-limiting factor in higher vertebrates which may influence the effect of predation. Possibly predators take principally those individuals that are surplus because of territorial insufficiencies. (3) The problem of setting up mathematical formulas based on rates of reproduction and mortality is influenced by the compensatory nature of many factors. The final level of population for an area tends to be predetermined. Compensations in factors include variations in reproductive rates and in various mortality factors, dependent upon population levels at the moment. Although general and of a review nature, the article should stimulate thinking.--Fred H. Dale.

Hammond, John. (Sch. Agr., Cambridge, Eng.) THE EFFECTS OF NUTRITION ON FERTILITY IN ANIMAL AND HUMAN POPULATIONS. p. 113-120. In "The Numbers of Man and Animals," J. B. Cragg and N. W. Pirie, eds. 152 p. Oliver & Boyd, Edinburgh & London. 1955.

Discusses, for animals, effects of nutrition on (1) age of puberty, (2) frequency of births during life of animal, and (3) number of eggs shed at each ovulation.--V. Schultz.

Lack, David. (Ed. Grey Inst., Oxford U., Eng.) THE MORTALITY FACTORS AFFECTING ADULT NUMBERS. p. 47-55. In "The Numbers of Man and Animals," J. B. Cragg and N. W. Pirie, eds. 152 p. Oliver & Boyd, Edinburgh & London. 1955.

A "superficial" assessment of the critical factors limiting animal numbers in nature, with a discussion of birds, mammals, large fish, and insects. Concludes that food shortage, predation and disease are not necessarily alternative limiting factors but may interact. "These examples, which could be multiplied, illustrate how the three main density-dependent mortality factors can interact. Probably they interact in every species, though to a varying extent, and their influence may also be much modified by factors which operate independently of density. Hence the way in which animal populations may regulate themselves under natural conditions is complex, and extremely difficult to study in the field."--V. Schultz.

Park, Thomas. (U. Chicago.) EXPERIMENTAL COMPETITION IN BEETLES, WITH SOME GENERAL IMPLICATIONS. p. 69-84. In "The Numbers of Man and Animals," J. B. Cragg and N. W. Pirie, eds. 152 p. Oliver & Boyd, Edinburgh & London. 1955.

Laboratory population research on interspecies competition concerned with proof that competition exists and with the end results of competition.--V. Schultz.

Symposium. A DISCUSSION ON THE DYNAMICS OF NATURAL POPULATIONS. Proc. Roy. Soc., Ser. B, Biol. Sci., 145(920): 291-364, illus. July 1956.

On population genetics. Based chiefly on studies of invertebrates and plants. Of the 13 papers, the following may be of the most interest to students of vertebrate field biology: The relation between density regulation and natural selection, by J. B. S. Haldane. Ecology and its bearing on population genetics, by P. M. Sheppard. Variations in the reproductive rate of birds, by David Lack. Natural populations and the breakdown of classical genetics, by C. D. Darlington.

WILDLIFE--BIOMETRICS

Boguslavsky, George W. (Cornell U.) STATISTICAL ESTIMATION OF THE SIZE OF A SMALL POPULATION. Science 124(3216): 317-318, 2 graphs. Aug. 17, 1956.

Describes a method for estimating with a stated level of confidence the size of a small population. Procedure appears to have limited application in wildlife studies.--A. D. Geis.

WILDLIFE--BIOMETRICS--Continued

Good, I. J., and G. H. Toulmin. THE NUMBER OF NEW SPECIES, AND THE INCREASE IN POPULATION COVERAGE, WHEN A SAMPLE IS INCREASED. Biometrika 43(1/2): 45-63. June 1956.

"A sample size of N is drawn at random from a population of animals of various species. Methods are given for estimating, knowing only the contents of this sample, the number of species which will be represented r times in a second sample of size λN: these also enable us to estimate the number of different species and the proportion of the whole population represented in the second sample."--V. Schultz.

Lotka, Alfred J. ELEMENTS OF MATHEMATICAL BIOLOGY. Dover Publications, N. Y. 10, N. Y. xxx + 465 p. 1956. $2.45.

Unabridged. "Formerly published as Elements of Physical Biology, this classic work is the first major attempt to apply modern mathematics to the problems of phylogeny, ontology, ecology, physiology, endocrinology, psychology, and other branches of biology." A bibliography of the author is included.--V. Schultz.

Snedecor, George W. STATISTICAL METHODS. 5th edition. Iowa State Coll. Press. xiii + 534 p. 1956. $7.50.

Innumerable changes have been made in this edition. The book is an excellent reference for those who have some familiarity with statistics. It is not recommended, however, for one who wishes to learn the fundamentals of statistics by himself. The author presents a section on factorial experiments and non-parametric tests. A chapter by W. G. Cochran, "Design and Analysis of Samplings," has much to offer wildlife biologists and even has a short discussion on sampling wildlife populations. Like earlier printings, this edition contains detailed interpretations of statistical and biological significance of results which one seldom finds in more elementary texts.--V. Schultz.

WILDLIFE--TECHNIQUES

Angier, Bradford. LIVING OFF THE COUNTRY. Stackpole Co., Harrisburg, Pa. 241 p., illus. with thumbnail sketches. 1956. $5.00. [From review in Outdoor News Bul. 10(25).]

"Divided into four main sections--Sustenance, Warmth, Orientation, and Safety--LIVING OFF THE COUNTRY is a thorough and readable presentation of methods of human survival far from the creature comforts that have become so commonplace. ...familiarity and understanding of the various survival techniques and outdoors worldliness contained in this book will add considerably to one's woodsmanship."

MacConnell, Wm. P., and Lester E. Garvin. (U. Mass.) COVER MAPPING A STATE FROM AERIAL PHOTOGRAPHS. Photogrammetric Engineering, Sept. 1956. p. 702-707. 1956.

From abstract: "A vegetation classification system was evolved which permitted the separation of vegetation on the aerial photographs consistently and accurately under all conditions. Photographs were interpreted and annotated in India ink; the interpreted information was transferred to U. S. G. S. maps at a scale of 2" = 1 mile; these maps were reproduced in quantity in black and white; the originals were colored; areas were determined and tabulated by cover types for towns, U. S. G. S. sheets, counties, and the state. To a map showing both planimetric and topographic detail has been added the vegetation which clothes the land in Massachusetts. These maps coupled with area statistics of the cover types place in the hands of the wildlife biologist a very important tool in game management." Work began in fall of 1953 and was 80% complete at time of writing.

Myers, K. (Wildl. Surv. Sect., C.S.I.R.O. Field Sta., Albury, N.S.W.) METHODS OF SAMPLING WINGED INSECTS FEEDING ON THE RABBIT ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 1(1): 45-58, 1 pl. Sept. 1956.

Summary: "Methods of trapping winged insects attracted to the rabbit...are described. Three traps have been devised to catch insects above ground and as they enter or leave rabbit burrows. Their application in studies of myxomatosis vectors and mosquito ecology are discussed." Basically, the apparatus consists of a conical trap that is suspended above a confined rabbit around which the trap is dropped when desired. Modifications are made, of course, for application to burrows.

Cabart, J. (Forschungsinstitut f. Forst- und Jagdwesen, Zbraslav, Czechoslovakia.) RESEARCH INSTITUTE FOR FOREST AND GAME AFFAIRS, CSR. Z. Jagdwissensch. 2(3): 182-185. 1956.

In German. From English summary: This Czechoslovakian institute regulates in general all matters pertaining to hunting that concern farmers and foresters. All material goes to study groups that work under an experienced expert. This official has at his disposal scientific assistants and, when necessary, a study circle consisting of foresters, agriculturists, or veterinarians. The institute is well staffed and well equipped. It endeavors to improve hunting affairs or at least to maintain them at the present level without danger to agriculture or forestry. The Institute serves science and practice, and employs the most modern methods of work.

Clarke, C. H. D. (Ont. Dept. Lands & For.) HUNTING AND FISHING IN CANADA'S FUTURE. 46th Conv. Internat. Assn. Game, Fish & Cons. Comm. p. 25-31. 1956.

A projection of what increasing populations and developments will mean, especially in Ont. Bright features as well as dark ones are brought out in this perceptive analysis. New forestry, mining, and highway projects are no longer causes of great concern for the increasing herds of woodland caribou and moose; indeed, they may lead to better management. More regimentation is almost certain; the management-unit system will be applied to the northlands. More organized sport hunting of carnivores is likely. Naturalists and photographers are increasing twice as fast as hunters; hunters should realize that interests of the 2 groups are largely the same. Wilderness will continue to be preserved because it "is one of our really exclusive marketable commodities."

FORTY-FIFTH CONVENTION OF THE INTERNATIONAL ASSOCIATION OF GAME, FISH AND CONSERVATION COMMISSIONERS--SEPT. 12 & 13, 1955--AUGUSTA, GEORGIA. 1-200 p. 1955. $2.00 from V. E. Joslin, 1356 N. Avon, St. Paul 13, Minn.

Contains many important papers by leaders in the field. The chief papers are: An appraisal of progress and potential opportunities as provided by Public Law 732, 79th Congress, and the joint policy of land acquisition on reservoir projects, Department of the Army, Department of the Interior, (Army Eng. view) by Brig. Gen. J. R. Hardin, (F&WS view) by J. T. McBroom. Report of National Water Policy Committee, by G. E. Eddy. Report of Committee on Wildlife Conservation Planning, by E. F. Swift. Report of National Land-Use Policy Committee, by Perry Egan. Qualifications and training for wildlife research and management workers, by D. L. Leedy. Application of research in a game and fish program, by G. C. Moore. The relationship of a wildlife research program to law enforcement personnel, by C. A. Dambach. A commissioner's viewpoint of research in establishing annual hunting and fishing regulations, by C. J. Mantle. Report of Committee on the Introduction of Exotic Animals, by M. O. Steen. Report of Committee on Federal Aid, by Ben Glading. Discussion of legislative matters, by C. D. Shoemaker. Application of controlled hunting to the take of waterfowl, by M. O. Steen. Application of controlled hunting to the take of big game, by T. L. Kimball. Public and private shooting preserves for game birds and small game mammals, by A. W. Schorger. Factors to be considered by the states in respect to restoring and developing waterfowl habitat, by N. G. Wilder. Factors of importance to the Canadian Provinces in respect to restoring and developing waterfowl habitat, by C. D. Fowle. The states' viewpoint of the effectiveness of the waterfowl flyway councils, by P. W. Schneider. The waterfowl research project of the Arctic Institute of North America, by A. M. Day. The Welder Wildlife Foundation, by Clarence Cottam. Public relations in law enforcement, by L. J. Bennett. Important factors involved in the modernization of state water laws, by C. E. Busby. Resolutions.

FORTY-SIXTH CONVENTION OF THE INTERNATIONAL ASSOCIATION OF GAME, FISH AND CONSERVATION COMMISSIONERS--SEPT. 13 & 14, 1956--TORONTO, ONTARIO. 1-253 p. 1956. $2.00 from V. E. Joslin, 1356 N. Avon, St. Paul 13, Minn.

Includes an exceptionally large number of important papers. A few are listed separately in this issue of WR. Among the others are: Wildlife and recreation for the future in the United States of America, by Seth Gordon. Report of National Water Policy Committee, by A. H. Underhill. Report of Committee on Endangered Species of Wildlife, by R. H. Pough. Need for education in wildlife conservation, by Enrique Beltran. Effectiveness of present school and youth programs in wildlife conservation, by O. C. Croy. The effectiveness of present

and future adult educational programs in wildlife conservation, by J. P. Blanchard. An educator examines present educational programs in wildlife conservation, by P. A. Herbert. Report of Committee on Federal Aid, by Ben Glading. Report of Committee on Changes in Allocation of Duck Stamp Funds, by H. D. Ruhl. Report of Legislative Committee, by C. H. Callison. Discussion of legislative matters, by C. D. Shoemaker. The soil bank act, by Thomas Hamilton [long discussion followed]. Wildlife versus power projects and industrialization--a view in perspective, by J. Hatter. Pollution and wildlife conservation, by G. E. Burdick. Water for wildlife in the multiple land-use concept, by H. C. Pickens. [Waterfowl] Research--a hope for the future, by D. A. Munro. [Waterfowl] Management--can it meet growing needs? by I. N. Gabrielson. The [waterfowl] refuge system--how far and how fast? by J. L. Farley. The national economic survey of hunting and fishing, by J. L. Farley. Resolutions.

Kingston, Lyle. ON BEHALF OF THE HUNTED. C. C. Nelson Publ. Co., Appleton, Wis. ix + 139 p., illus. 1955. $3.00.

As a boy, Lyle Kingston saw the rough lumber camps of n. Wis. and enjoyed an abundance of fish and game that is now gone. He grew up to be a professional engineer; a nature lover; an addicted fly fisherman; a devoted enemy of bait fishing and spinning tackle; an enthusiastic hunter with shotgun, rifle, and bow; an ally and critic of the Wis. fish and game staff; a free-thinking conservationist; and the author of a weekly conservation column in a newspaper. All these facets of his life are reflected in the 106 essays that make up this book. Most of the essays are a page or two in length, are written in crisp, practical style, and have marginal sketches by Charles E. Schafer. A few merely tell of the tricks of fishing, adventures in the woods, or the thrill of meeting a bear. Others tell persuasively why and how trout populations should be conserved, argue the evils of liberalized fishing for bass in Wis., show why pollution must be attacked at the national level, or point out the need of regulation of abuse of private lands. All wildlife biologists will agree with Kingston on the need of stopping drainage of wetlands, the value of either-sex shooting for control of deer herds, the stupidity of "sky busting" in waterfowl shooting, ways of reducing cripple losses, the promise of hunter-farmer cooperatives, the urgency of conservation education, and many other points. They may consider more controversial his arguments that grouse cycles stem from inbreeding, that scarcity of fish and game are caused in large part by overly efficient tackle and guns of too much killing power, that scarcity of pheasants in the Dakotas is attributable largely to use of corn-picking machines, and that high bounties would be the best form of predator control. All wildlife workers, however, will be interested in Kingston's plans for staggered deer seasons, managed core areas for prairie grouse, classification of streams for either beaver or trout, immediate classification of streams for industrial or recreational use, and in his blueprint of how a state conservation department should be organized.

MANAGING OUR FISH AND WILDLIFE RESOURCES. U. Minn. Center for Continuation Study, Minneapolis 14. vii + 74 p., illus., mimeo. Jan. 1956.

Contains 12 papers that were presented at a 2-day meeting in Jan. 1956. These papers are semitechnical in nature. They are designed to convey facts and principles of fish and game management to intelligent, receptive minds. In general, they are based on material that is available in other sources and some have been published elsewhere. Titles and authors of the game papers are: Land use and deer management problems in the Black Hills of South Dakota, by Lester M. Berner. The whitetailed deer in Wisconsin, by B. L. Dahlberg. Deer and land use in Minnesota, by Milton H. Stenlund. Upland game - pheasant, by J. W. Kimball. Upland game - grouse, woodcock, etc., by Wm. H. Marshall. History of waterfowl management in America, by Clarence Cottam. Waterfowl production fundamentals, by Arthur S. Hawkins. Marsh development and Canadian management [by Ducks Unlimited], by B. W. Cartwright.

PROCEEDINGS OF THE THIRTY-SIXTH ANNUAL CONFERENCE OF WESTERN ASSOCIATION OF STATE GAME AND FISH COMMISSIONERS, Vancouver, British Columbia, June 7, 8, 9, 1956. xvii + 268 p., mimeo. 1956. $2.00 from Ben Glading, Calif. Dept. Fish & Game, 926 J St., Sacramento 14, Calif.

A paper-bound volume, 8.5 x 11 x 3/4 in. in size, that contains 70 consecutively paged papers on fish and game problems. Many of the technical game

papers are listed separately in this issue of WR. One group of good papers, not listed individually in this issue of WR, consists of discussions of what various states and provinces are doing to manipulate hunting regulations and areas to provide sustained good hunting in the face of rising human populations in the West. The flexibility and versatility of their systems is impressive. Another group of papers, by commissioners, discusses the functions and attitudes of commission members. These papers bring out the need for reliance on good technical information, but they imply that state game research should be of an immediately practical type. The paper by F. E. Newby on management of Mont. fur animals is a good example of highly practical, progressive management that was based in part on studies that some administrators might not consider immediately practical.

Sigler, Wm. F. (Utah State Agr. Coll.) WILDLIFE LAW ENFORCEMENT. Wm. C. Brown Co., Dubuque, Iowa. 318 p., 1956. $4.50. [From Outdoor News Bul. 11(3).]

Many wildlife biologists have to do enforcement work full-time or part-time and game departments have urged that they be trained for it in college. Purpose of this text is to facilitate such schooling. It covers all aspects of enforcement, including legal phases and technics.

Smith, Orville A., Jr., and Aelred D. Geis. (Geis: Patuxent Refuge, Laurel, Md.) COMPARATIVE PSYCHOLOGY IN WILDLIFE CONSERVATION. Am. Psychologist 11(4): 183-187. Apr. 1956. [Reprints available from junior author.]

Points out with many wildlife examples the potential value of an understanding of animal behavior in solving wildlife problems. Advocates more training in animal behavior for wildlife students and suggests appropriate courses.--A. D. Geis.

Tratz, E. (Haus der Natur, Hofstallg. 7, Salzburg, Austria.) HUNTING IN THE SOVIET UNION. Z. Jagdwissensch. 2(3): 185-188. 1956.

In German. From English summary: Shooting and nature preservation in the Soviet Union are subject to central administration despite the far-reaching independence of the various republics. Licensed hunters are generally permitted to shoot anywhere except in nature and game preserves and in leased shooting areas of hunting organizations. Special regulations are in effect for fur animals, for these are a state monopoly. Protective regulations, which are very strict in part, ensure stocks of huntable animals. Hence moose, saiga antelopes, sables, and beavers have increased. Sea otters and Siberian tigers are strictly protected. Noteworthy is the rearing of Dybowski deer and reindeer in large preserves.

Webb, James W., editor. PROCEEDINGS OF THE SOUTHEASTERN ASSOCIATION OF GAME AND FISH COMMISSIONERS MEETING, DAYTONA BEACH, FLORIDA, OCTOBER 2-5, 1955. Printed at Columbia, S. C., by SE. Assn. Game & Fish Comms. 1-235 p., map and graphs. 1956. $2.00 from J. W. Webb, Sec.-Treas., Box 360, Columbia, S. C.

A well-printed volume of 6 x 9 x 1/2 inches. The 21 technical game papers published here were covered in WR 83 from mimeographed copies and need not be listed again. There are also 8 technical fisheries papers. Papers of other types include several on conservation education, several on law enforcement, and several on progress made in fish and game work of the SE. during the last decade. Four panel discussions are summarized briefly.

WILDLIFE--HUNTING AREAS & PROBLEMS

Howard, Walter E., and William M. Longhurst. (U. Calif., Davis.) THE FARMER-SPORTSMAN PROBLEM AND A SOLUTION. Trans. 21st N. Am. Wildl. Conf. p. 323-329. 1956.

There are now so many hunters that many landowners are literally forced to close their lands. Since new methods of allocating access privileges have not kept pace with the increasing hordes of sportsmen, much private land has been closed completely. This article is principally a discussion of the merits of the fee basis for permit hunting and fishing as a means of unlocking some private land that is now closed. Such a system, on private land that is now lost to sportsmen, would give farmers an incentive not only to increase the

density of fish and game, but also to preserve more wetlands, woodlots, and other marginal areas now labeled as worthless. A profit motive would encourage landowners to integrate management of fish and game, which can be profitable agricultural crops, with other farming pursuits. He would not be commercializing the public's fish and game, but rather he would be paid for the management of people whenever he granted the privilege of access. Actually, many farmers do not want a financial gain. They have found that relief from trespass problems alone make it worth while to lease hunting and fishing rights on their land. Even though there is no simple solution to the farmer-sportsman problem, the creation of an incentive for wildlife management among private landowners, whose farms, forests, and rangelands comprise almost 3/4 of continental U. S., will certainly provide more opportunities for outdoorsmen as well as reducing pressure on public lands and demands for further "opening-up" the few remaining wilderness areas.--Authors.

Leopold, A. Starker. (U. Calif.) HUNTING FOR THE MASSES--CAN GAME DEPARTMENTS SUPPLY IT? Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 59-64. 1956.

Artificial propagation of game and wholesale predator control are common state functions. They are terrifically costly and are unjustified on economic grounds except under special situations. We must look to the day when these great sums can be spent on more realistic work. The chief aim of game management should be to provide sportsmen with the maximum opportunity to enjoy themselves in the field; provision of maximum stocks of game is important but secondary. To achieve these aims we should have far better harvest of small resident game; we have been far too conservative here. We should have longer seasons even if this means smaller bag limits. Limited shooting of less abundant species, some of which are now protected, would provide choice sport. Landowners are becoming aware of the value of hunting rights. Public hunting is on the way out except on public lands; these lands may eventually be of greatest value for recreation. Game departments can do only a limited amount of actual habitat improvement. Landowners can do a great deal but seldom will. "...I am convinced that the only team that can accomplish habitat management on private land is the landowner working with sportsmen who supply the cash and often much of the manpower." This is a good and increasingly common arrangement; it gets the job done and the men get much interest and satisfaction from the management work. One of the best and most important things a game department can do is to provide skilled extension services for such groups. This extension work needs great expansion; it could be financed by dropping obsolete functions such as artificial stocking and general predator control. There is plenty of precedent for such services to private interests, as shown by work of agriculture departments.

McClelland, Royal. (508 W. Charles St., Champaign, Ill.) HUNTING UNLIMITED. Ill. Wildl. 11(4): 3-5 (unnumbered), 6 photos. Sept. 1956.

Much helpful information on how sportsmen's groups can provide put-and-take shooting and dog trials through use of pen-reared birds. "It can be predicted now that put-and-take shooting will become one of the most popular activities of organized sportsmen's groups in the next few years. Any sportsmen's club can now offer its members the opportunity to shoot pheasants and/or mallard ducks between October 15 and February 15 at from $1.50 to $2.50 per bird."

Wolf, Bill. THE FUTURE OF SHOOTING IN AMERICA. PART 4. THE PENNSYLVANIA PLAN. Sports Afield 135(4): 80-81, 143-147, 6 figs. Apr. 1956.

Long account of system by which Pa. Game Comm. has opened 10,404 farms, a total of 1,054,229 acres, to small-game hunting. These farms are in 168 projects, chiefly near population centers. Each project consists of a group of adjacent farms that must total 1,000 to about 20,000 acres. These areas are not the same as state game lands. Small refuges are marked off in each project area. The state does border cutting and other habitat improvement work in the areas. Costs, paid from PR funds, now run around $350,000 per year, or about 35¢ an acre. Hunters benefit from having farms open to them and more game on the farms. Farmers sign 5-year contracts. They benefit in many ways: Safety zones are marked off around buildings. Farmers retain trapping rights if they wish. The lands are especially patrolled during seasons. The lands receive priority in game stocking. Farmers may be paid to trap surplus game for stocking elsewhere.

They are paid to rear pheasant chicks. They are paid to leave grain standing around fields. They receive bird repellents when needed, as well as predator-control service. They are given much help in farm planning, management of pastures and woodlots, drainage, pond construction, soil conservation, and establishment of windbreaks and other tree and shrub plantings of agricultural or forestry value. The program seems to work well and cancellations are few.

WILDLIFE--INTRODUCTIONS

Cottam, Clarence. (Welder Wildl. Found., Sinton, Texas.) THE PROBLEM OF WILDLIFE INTRODUCTIONS--ITS SUCCESSES AND FAILURES. 46th Conv. Internat. Assn. Game, Fish & Cons. Comm. p. 94-111. 1956.

A major, informative, well-balanced paper on introductions and transplants of game and nongame animals in the U. S. It reviews many examples and their results and discusses policies that have been or should be followed. But official policies have little effect on the extensive private stocking that is going on without control, and apparently zoos must share the blame. According to Lehman (quoted on p. 100), "On four Texas ranches with which I am familiar at least 15 different foreign animals and birds have been liberated, and most of them came from zoos. At least one species, the black buck antelope, and possibly another, the Nilgai antelope, have increased to the extent of competing with native deer and livestock on some of these areas, and they have spread to adjoining properties." Other private introductions of big game species are mentioned. Dr. Cottam reaches a number of conclusions, some of which may be listed here. Introductions have not been limited to vacant niches. Even under the present official program, exotic game birds are being released where there are good populations of native game birds; this, of course, is highly objectionable. Major effort should be put on improving habitat for native animals, not on importing exotics. Species to be introduced should be studied closely for possible ill effects. Fur animals, and animals intended to exercise some type of biological control, should be examined with extreme caution before importation, as several examples demonstrate. Much more study should be given the problem of big game introductions [which are now virtually promiscuous]. Exotics should be selected carefully to fit specific niches. Private introductions and stockings require far more state regulation. Introductions that are to be made should be adequate in quantity and timing. It is economically and genetically unsound to keep releasing a species where it is already established.

Groves, Frank W. (Nev. Game Comm.) REPORT OF THE COMMITTEE ON THE INTRODUCTION OF EXOTIC ANIMALS. 46th Conv. Internat. Assn. Game, Fish & Cons. Comm. p. 77-85. 1956.

Results of questionnaire sent to state game departments to ascertain attitudes on game introduction program and legal powers to exclude undesirable species; proposed draft of memorandum of understanding on how introductions should be handled; table showing game birds introduced 1950-56; proposed revision of Lacey Act. In general the committee proposes to strengthen the introduction program and improve its procedures, and to strengthen the state and federal governments in their legal position to prevent introduction of undesirable species.

Linduska, J. P. (Remington Farms, Chestertown, Md.) FOREIGN GAME ANIMAL INTRODUCTIONS--PROSPECTS FOR THE FUTURE. 46th Conv. Internat. Assn. Game, Fish & Cons. Comm. p. 111-116. 1956.

Tells how difficult it was to get the starling established in the U. S. and the rabbit in Australia. These and other examples suggest that the role of genetic preadaptation of individuals is important in whether exotics succeed or fail. In this line of thought, exotics should come from areas as much like the release site as possible. Releases should be massive to provide plenty of genetic raw material. The game-farm step is liable to breed out desirable wild characteristics. New releases where an exotic is already established may have bad genetic effects and should be withheld for perhaps a 10-year trial period. The state-federal importation program should be much expanded if satisfactory results are to be obtained. Needs of all states should be determined by inventory. Priorities should be set up. A coordinated, ecological survey of

all release areas should be made. A board of review should be set up to screen proposed introductions. Legislation at national level is needed to stop undesirable introductions. Many states need similar legislation.

WILDLIFE--ECONOMIC & OTHER VALUES

Crossley, S-D Surveys, Inc. TECHNICAL SUPPLEMENT TO NATIONAL SURVEY OF FISHING AND HUNTING. US F&WS, Supplement to Cir. 44. 107 variously numbered pages + specimen material in endpocket. 1956. [Only 250 copies were produced for official use.]

Detailed, technical material on just how the survey was conducted; of interest only to planners and operators of surveys. This multilithed document contains the sampling plan, interviewing techniques, and questionnaires used by the firm of Crossley, S-D Surveys, Inc. in conducting the first nationwide economic survey of sport fishing and hunting in the U. S. under contract with the F&WS.

Patton, R. D. (Ohio State U.) THE WILDLIFE ECONOMIC SURVEY AND WHAT IT MEANS TO WILDLIFE MANAGEMENT. 46th Conv. Internat. Assn. Game, Fish & Cons. Comm. p. 196-200. 1956.

Three of the author's major conclusions are that the best available areas should be developed for hunting and fishing no matter how far they are from population centers; that there is still much opportunity to generate interest in hunting and fishing trips (and resources) in women and city dwellers; and that the economic magnitude of hunting and fishing justifies greater research expenditures even if the cost must come from higher licenses or appropriations from general funds.

WILDLIFE--PREDATION, CROP DAMAGE, CONTROL

Brüll, H. (Forschungsstation Wild, Wald und Flur, Weissenhaus, Post Lütgenburg, Holstein, Germany.) STUDIES ON THE SIGNIFICANCE OF GOSHAWKS IN SMALL GAME RANGE. Z. Jagdwissensch. 2(3): 165-174, 4 graphs. 1956.

In German. From English summary: Detailed, 6-year study of range, foods, and effect as predators of a pair of goshawks. Yearly range covered about 4,000 ha. It is shown that various game animals were eaten, but that this would not have affected the shooting in the area. Pheasants were increasing in the area despite the presence of the hawks.

Craighead, John J., and Frank C. Craighead. HAWKS, OWLS AND WILDLIFE. Stackpole Co. (Harrisburg, Pa.) and Wildl. Mgt. Inst. xix + 443 p., 67 photos, 22 maps, 12 figs. 1956. $7.50.

Technical monograph on biology and prey relationships of raptors. It is based on an enormous amount of field work on large study areas near Ann Arbor, Mich., and Moose, Wyo. in several years. The value of the work as a source of information is suggested by the presence of 100 tables and 3 appendices. The authors determined the numbers, range sizes, movements, and hunting habits of hawks and owls at different seasons of the year. They studied nesting success and intra- and interspecific relationships. They made extensive studies of food habits and conducted experiments on amounts of food eaten. Furthermore, they estimated population densities of many prey species. With these data in hand they were able to make calculations on the effect of predation and on factors governing predation. They conclude that predation is roughly proportional to relative prey densities. Secondary in importance are prey-risk factors, such as quality of cover. Predation can be a limiting factor, as it was found to be for Microtus under at least 1 situation. Predation operates continually to lower the rate of prey increase in proportion to prey density, and to do this before strife, disease, or starvation become dominant. Prey increases, therefore, are likely to be checked before they become excessive. Collective raptorial pressure tends to depress all prey species simultaneously toward the threshold of security. Thus, under natural conditions, no 1 prey species can draw enough predation pressure to keep its population at a dangerously low level. The book was written several years ago; no references published since 1953 are cited. Readers consequently are deprived of the authors' comments on such pertinent recent works as those of Lack and Andrewartha and Birch.

Hagen, Yngvar. THE IRRUPTION OF HAWK-OWLS (SURNIA ULULA (L.)) IN FENNOSCANDIA 1950-51 WITH SOME REMARKS ON RECENT MICRO-RODENT CYCLES. Stavanger (Norway) Museum, Sterna no. 24. 1-22 p., 6 figs. June 1956.

In English. An exceptional number of hawk-owls appeared in central and s. Fennoscandia in fall and winter of 1950-51. Some writers felt that these birds must have come from the U.S.S.R., inasmuch as Fennoscandian vole and lemming populations in 1950 were too low to have supported much owl reproduction. Time of appearance of the owls in different parts of Fennoscandia suggests, however, that the owls came from the n. or nw. and therefore from within Fennoscandia. Hagen discusses small rodent fluctuations and populations of the region in some detail. He shows that 1950 was the end of a period in which rodent populations were adequate for owl reproduction and that adequate rodent populations persisted until early 1950, when the owls would have bred. He also provides quantitative data to show that relatively modest rodent populations are enough to support good owl reproduction, and that even these relatively low rodent populations are far greater than those found at the bottom of the cycle. The rodent population data involve indexes based on catch per 100 trap-days.

Johnston, Richard F. (MVZ, U. Calif., Berkeley.) PREDATION BY SHORT-EARED OWLS ON A SALICORNIA SALT MARSH. Wilson Bul. 68(2): 91-102, 2 figs. June 1956.

Summary: "The Short-eared Owl is a common winter visitant to the salt marshes around San Francisco Bay. Between four and ten owls live in the winter on the study plot of some 200 acres on the San Pablo salt marsh. The owls forage mainly at night there. Of 638 items found in pellets, 75 per cent were mammals, 20 per cent birds, and 5 per cent insects. Mammals were responsible for about 90 per cent of the mass consumed, Microtus and Rattus being the most important kinds. The relationship of Short-eared Owl predation to the community food web is indicated by means of a diagram."

Lockie, J. D. THE BREEDING HABITS AND FOOD OF SHORT-EARED OWLS AFTER A VOLE PLAGUE. Bird Study 2: 53-69, 1955. [From J. Anim. Ecol. 25(1).]

"A discussion of predator-prey relationships during the decline of a short-tailed vole plague in Stirlingshire. During the spring of 1954, thirty to forty pairs of owls on 3500 acres were estimated to have taken 3 to 13% of the voles, which were then exposed owing to lack of cover, and this probably contributed to the decline of the voles. With the growth of cover, and the production of young by the voles, coupled with the disappearance of the owls after they had bred, only two pairs of birds remained, and the proportion of voles taken by these fell to between 2 and 6% of the population. Other predators included kestrels and foxes, the latter, together with crows, preying also on the owls at the nest."

Michelbacher, A. E., and Stephen Hitchcock. (U. Calif.) CALICO SCALE ON WALNUTS. Calif. Agr. 10(9): 6, 3 figs. Sept. 1956.

Two entomologists credit Audubon's warbler and a parasitic wasp with effective control of a potentially damaging scale insect in Calif. Control ranged from 96-100%. The results are considered especially interesting because certain other scale insects are increasing as modern insecticides interfere with their natural enemies. Natural control of calico scale occurs despite use of DDT and OMPA on the trees.

Presnall, Clifford C. (US F&WS, Wash., D. C.) CHANGING TRENDS IN PREDATOR MANAGEMENT. Trans. 21st N. Am. Wildl. Conf. p. 185-190. 1956.

Based on questionnaires returned by state game departments. Most states or their subdivisions still have bounties; officials in general wish to get away from bounties but have too little public support for this shift. Predator control today is favored less as an aid in game management than as an aid in livestock and poultry production and in control of such diseases as rabies. Related matters are also reviewed briefly.

Türcke, F. (Eispfad 1, Springe, Hann., Germany.) CHEMICAL MEANS OF PREVENTING DAMAGE BY WILDLIFE IN LIGHT OF NEW RESEARCH RESULTS. Z. Jagdwissensch. 2(3): 131-135. 1956.

In German. From English summary: The technical qualities of preventives against game damages (i.e., viscosity, adherence, drying capacity, wiping resistence, and resistence against rain) are of primary importance. They must meet

manifold and exacting demands and must harmonize with one another from the beginning. In order to avoid phytotoxicity, the capacity of the preparation to dry and harden are of decisive importance. To attain an adequate defense against bark-biting and debarking, a certain strength of a mechanically effective protective layer is especially necessary in addition to use of a proved repellent. When employing these preventives in the forest, application by spreading is preferable to spraying. Chances of positive results are favorable when the most recent chemical preparations are used.

WILDLIFE--REPORTS OF ORGANIZATIONS & REPORTS OF HARVESTS

Alberta. ANNUAL REPORT OF THE DEPARTMENT OF LANDS AND FORESTS...FOR THE FISCAL YEAR ENDED MARCH 31ST 1956. Edmonton. 108 p., maps & graphs. 1956.
Report of the Fish & Game Commissioner, p. 55-68, includes a table of numbers and values of wild furs (by species) produced during the year and a table of estimated total kills of each species of big game and 8 species of game birds in each year, 1952-55. The text concisely summarizes activities. The season was opened on deer and moose after a period of closure; the resulting big-game kill of about 12,805 was 438% higher than in 1954. Kills of most kinds of game birds were also higher than in 1954. Wolves presented little or no problem, largely because of the rabies-control program of the past 4 years.

Maryland. MARYLAND BOARD OF NATURAL RESOURCES / TWELFTH ANNUAL REPORT / 1955. Annapolis. xiii + 201 p., illus. 1956.
This volume contains the annual reports of the departments of Tidewater Fisheries; Game and Inland Fish; Forests and Parks; Geology, Mines and Water Resources; and Research and Education. The Game and Inland Fish report (p. 59-87) includes brief descriptions of management and research projects and some of their results and presents tables of numbers of reared or transplanted birds and mammals released. The report of the Dept. of Research and Education includes descriptions of work done with deer, waterfowl, mourning dove, bobwhite, and ruffed grouse. Data are given on age ratios and times of hatching of mourning doves as determined from wings, and age ratios of bobwhites, also determined from wings. Ruffed grouse were studied to ascertain length of tail feather that will separate locally bagged males and females; the point of separation was found to be 156 mm.; sex ratio of the sample was 114 males per 100 females.

Montana. BIENNIAL REPORT OF THE FISH AND GAME COMMISSION FOR MAY 1, 1954--APRIL 30, 1956. 1-83 p., illus. 1956.
The section on game contains several units of interesting information. In the decade 1945-55, elk increased from 29,100 to 51,700, whitetail deer from 34,200 to 69,200, mule deer from 88,000 to 197,900, and pronghorns from 25,200 to 59,300. The Commission's winter ranges for big game have been highly successful in protecting game and lessening crop damage. Bighorns and mtn. goats are being introduced into new ranges. Merriam's turkeys are being introduced into a few parts of the state and show promise of establishment. Freeze-out Lake (Greenfields), a 10,000-acre area based on an irrigation sump, is being developed extensively and should become a major waterfowl management area. This important project is described at length. Status of upland game birds is discussed and game farm production is reported. Policy is to rear only pheasants and chukars: chukars for establishment, pheasants for stocking of grown birds just prior to shooting where hunting pressure is high and pheasants few. Pheasant eggs, however, are distributed to interested individuals and groups. Numbers and values of pelts taken during the biennium are tabulated by species. Management and research activities of the state's vigorous and progressive Fur Resources Section are described briefly for beaver, mink, and marten.

New York. CONSERVATION DEPARTMENT FORTY-FOURTH ANNUAL REPORT FOR THE YEAR 1954. Legislative Doc. (1955) no. 47. 1-373 p., illus. 1955.
Report of Bureau of Game (p. 178-221) describes, with some mention of findings, research projects on deer management, pathology, waterfowl management, control of game damage, marsh management, released pheasants and turkeys, etc. Game farm production is tabulated in detail. Work done in game management districts is itemized. Descriptions are given of work accomplished on special

management areas, in water chestnut control, in habitat improvement on state and private lands, and in control of rabies and foxes. The Department's regulatory orders are discussed for various game and fur species. Graphs show trends in numbers of nests and broods of wild pheasants, 1945-54. Beaver pelts tagged are listed by county, 1950-54. The 1954 kill of bears is listed by county; calculated total was 372. Deer kill is tabulated by county, sex, age, and day of season. One interesting finding reported (p. 182) is that the mechanical deer repellent called the "Deerfly" proved to be of no value in protecting field crops and orchards in N. Y. Deer soon learned to ignore the sounds of this device.

New York. CONSERVATION DEPARTMENT FORTY-FIFTH ANNUAL REPORT FOR THE YEAR 1955. Legislative Doc. (1956) no. 88. 1-262 p. 1956.

The report of the Bureau of Game occupies pages 131-165. It describes, with limited summaries of results, research projects on deer management, pathology, waterfowl management, marsh ecology, evaluation of habitat improvements, control of game damage, turkey releases, cottontail management, and the controversial Grenadier Island pheasant-hardening experiment. Results of this experiment are given in preliminary form. The fox and rabies control project is discussed. The basic approach of this project was changed: trapping was done in epizootic areas rather than in zones around them. Regulations in force for taking game and fur animals are stated. Size of catch is mentioned for beaver, otter, and fisher. Deer kill is tabulated by county, age, and sex. Work done in management districts of the state is itemized, as is that done on specific management areas. Habitat improvement steps taken on state and private lands are described. Figures are given on game birds propagated and stocked.

Tennessee. ANNUAL REPORT STATE GAME & FISH COMMISSION, 1954-55 FISCAL YEAR. 1-40 p., illus. 1956?

A good general report of Commission organization and activities. It includes information on work done to improve waterfowl habitat, planting materials distributed to upgrade habitat for farm game, management work done and game bags obtained on special management areas, ages of deer killed, and estimated statewide bags of all game species or groups. Deer kill for the state reached a new high of 2,019. Management areas were increased to a total acreage of 582,033, much of which was owned by other agencies or companies.

Washington. DEPARTMENT OF GAME / STATE OF WASHINGTON / TWELFTH BIENNIAL REPORT / APRIL 1, 1953 THROUGH JUNE 30, 1954. 19 p. 1955.

Financial report only.

Wyoming. ANNUAL REPORT WYOMING GAME AND FISH COMMISSION 1955. 65 p., illus. 1956.

Kills of big game are reported by species for the years 1946-55 and by species and management unit for 1955. Inventories of big game, by species, are given for years 1951-55. Harvests of big game finally are leveling off after a long rise and no great new increase is expected. Sustained heavy hunting pressure has had excellent results in spreading game to new ranges. The first chukar hunt was held in 1955 and about 1200 of these birds were bagged. The first turkey hunt in many years took place after much restoration work. Approximately 224 turkeys were shot. Game farm releases of pheasants and chukars are reported in detail. Brief accounts are given of PR management projects. PR research and survey projects are described and some of their findings are mentioned.

WETLANDS & WILDLIFE

Garlick, Lewis R. (US F&WS, Milwaukie, Ore.) METHOD AND MATERIAL IN CARP CONTROL WORK, MALHEUR FEDERAL WILDLIFE REFUGE. Proc. 36th Ann. Conf. W. Assn. State Game and Fish Comms.: 110-112 [see also p. 75-77]. 1956.

Carp became abundant in this great waterfowl marsh and the important sago pondweed disappeared. It was decided to treat the whole marsh, more than 12,000 acres at low water levels, and all tributary waters, with rotenone solution distributed from land, air and water. Information on this vast and difficult project is given. Kill was excellent except in a small central area that apparently was spring-fed. Turbidity dropped quickly and sago pondweed again developed in abundance.

WETLANDS & WILDLIFE--Continued

Maryland. WETLANDS OF MARYLAND. Md. Game & Inland Fish Comm., Job Completion Rep., PR Project W-30-R. 10 p., + 50 tables + 21 maps. 1956.
All wet areas of 1/2 acre or more, including farm ponds, were inventoried in 1955. Results are given in tables and maps. Acreage of each wetland type in each county is tabulated and mapped. One set of tables shows the acreage of each wetland type in each county that is of high, medium, or low value for the major game and fur animals.

RANGELAND & WILDLIFE

Bentley, J. R., L. J. Berry, D. R. Cornelius, and R. M. Love. RANGE SPECIES RECOMMENDED FOR SOWING ON CLEARED BRUSHLAND IN CALIFORNIA. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 111. 1-9 p., 4 photos. Aug. 1956.

Hubbard, Richard L. THE EFFECTS OF PLANT COMPETITION UPON THE GROWTH AND SURVIVAL OF BITTERBRUSH SEEDLINGS. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 109. 1-9 p., 3 figs. Aug. 1956.
Report of study of methods of re-establishing this important deer-range plant. Seedlings did very much better when competition with other plants was minimal. Suggestions are given for site preparation and planting methods that should favor bitterbrush.

Hubbard, Richard L. EFFECT OF DEPTH OF PLANTING ON THE EMERGENCE OF BITTERBRUSH SEEDLINGS. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 113. 1-6 p., 1 fig. Sept. 1956.

Hubbard, Richard L. BITTERBRUSH SEEDLINGS DESTROYED BY CUTWORMS AND WIREWORMS. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 114. 1-2 p. Sept. 1956.
These insects have killed up to 90% of seedlings in experimental plantings.

Ragsdale, Dan W. COMPARISON OF CERTAIN METHODS OF DETERMINING UTILIZATION OF RANGE FORAGE. M. S. thesis, Colo. A & M Coll. 1955. [Long abstract in J. Range Mgt. 9(5): 229. Sept. 1956.]

Vallentine, John F. (Texas A & M Coll.) USE OF INDICATOR METHODS IN RANGE DIGESTION TRIALS. A REVIEW. J. Range Mgt. 9(5): 235-239. Sept. 1956.

FORESTLAND--FORESTRY & ECOLOGY

Martin, J. Lynton. (Nova Scotia Mus. Sci.) AN ECOLOGICAL SURVEY OF BURNED-OVER FOREST LAND IN SOUTHWESTERN NOVA SCOTIA. For. Chron. 42(3): 313-336, 3 figs. Sept. 1956.
Study of vegetation and soils of burns of various ages.

FORESTLAND--MANAGEMENT FOR & DAMAGE BY WILDLIFE

Burke, Hubert D. WILDLIFE HABITAT RESEARCH NEEDS IN SOUTHERN FORESTS. US For. Serv., S. For. Exp. Sta. (704 Lowich Bldg., 2026 St. Charles Ave., New Orleans 13, La.), Occ. Pap. 149. iii + 64 p., 4 figs. 1956.
A long and valuable review paper that should be available to everyone concerned with forest-wildlife work. It discusses wildlife research needs in southern forests, suggests research topics, and cites 225 references. Both management for wildlife and control of damage by wildlife are considered. Problems are taken up first by habitat relationships and then by species. Major sections are: Analysis of the forest wildlife habitat, Integration of wildlife with timber management, Interspecies competition and integration of wildlife with livestock grazing, Problems of some important wildlife species, Problems of forest lakes and streams, and Summary of research needs. In the last section, objectives are outlined and priorities are assigned to specific research subjects.

Dickinson, Nathaniel. (Cornell U.) SOME OBSERVATIONS REGARDING WOODLOT FENCING UNDER THE FEDERAL AID PROGRAM IN NEW YORK. N. Y. Fish & Game J. 3(2): 234-240. July 1956.

From abstract: "It was found that, in roughly 80 percent of the cases, fences had been constructed and the majority of these had been satisfactorily maintained. Differences in the nature of the problem within the State were noted, being related to topography and the nature of adjacent areas. The majority of the woodlots observed showed evidence of light or moderate prior grazing, or none at all, raising the question of whether or not the fencing was of benefit to wildlife habitat. In general the farmers were quite passive to the project and its success seems to lie in the fact that such fences are multipurpose [of economic value to farmer]."

Johnson, John W., and others, compilers. PROCEEDINGS SOUTHEASTERN DIRECT SEEDING CONFERENCE, AUGUST 22-23, 1956, SAVANNAH, GA. Union Bag-Camp Paper Corp. iii + 66 p., proc. Oct. 1956.

Takes up all problems and aspects of direct seeding for reforestation. Since direct seeding has become feasible only since methods of controlling seed-eaters have been discovered, much attention is devoted to such control, especially on p. 34-44, where remarks of Don Spencer are reported. The best treatment now known consists of 4 ingredients: 1. Endrin. Protects from rodents and insects. 50% wettable powder. Use at rate of 1 lb. of 50% concentrate per 100 lbs. seed. 2. Arasan 75. Protects from fungi, and possibly birds. Use at rate of 2.6 lbs. per 100 lbs. seed. This amounts to 2% of thiram, the active ingredient. 3. Aluminum powder. Affords protection from birds and gives seed identifying color and some lubrication. Use at rate of 8-10 oz. per 100 lbs. seed, or until seeds are coated. 4. Dow Latex 512R. Sticker for other ingredients. Dilute 1 in 10 with water. About 1 gal. of diluted latex treats 100 lbs. seed. Spencer emphasizes that not all Endrin preparations are compatible with this mixture, and that the whole field is moving so rapidly that prospective users of seed protectants should contact him before proceeding. His address is Mr. D. A. Spencer, Wildl. Res. Lab., Bldg. 45, Federal Center, Denver 2, Colo.

STRIPPED LAND & MISCELLANEOUS HABITATS

Brierley, J. K. (Manchester Grammar Sch., Eng.) SOME PRELIMINARY OBSERVATIONS ON THE ECOLOGY OF PIT HEAPS. J. Ecol. 44(2): 383-390, 1 pl., 2 figs. July 1956.

Comparative study of natural vegetation on pit heaps at coal mining sites in Britain and of mode of establishment of this vegetation.

Dambach, Charles A. (Ohio State U.) ROADSIDE USE HAS A PART IN THE CONSERVATION PROGRAM. In Tenth Short Course on Roadside Development. Publ. by Dept. Landscape Architecture, Ohio State U., and Ohio Dept. Highways. p. 16-22, 2 photos. Apr. 1951.

Ohio's roadsides total some 250,000 acres, more than state forests. Well-vegetated roadsides provide wildlife cover that is much needed in an intensively farmed state. "Mile for mile and acre for acre Ohio's roadsides are next to farm fence rows, probably the most productive areas of wildlife lands in the state." Several things can be done to improve roadsides for conservation purposes. Roadsides should be kept vegetated with native plants adapted to the site. Low herbaceous vegetation should be kept next to road, woody cover at outside of right-of-way. If woody plants are used, clumps of them should not be planted opposite each other on both sides of the road, for such an arrangement increases tendency of animals to cross road. Mowing should be delayed until as late in season as possible so first broods and litters can be brought off. Mowing should be done as late as possible to reduce amount of roadside nesting cover present next spring. Herbicides should be used with caution to avoid damage to plantings of wildlife value. Pullouts should be planned where highways pass spots that are of special interest for their game concentrations or are conservation demonstration areas. Such spots could be used not merely for sight-seeing, but also to help popularize conservation.

CONTROL OF UPLAND VEGETATION WITH HERBICIDES ETC.

Goodrum, Phil D., and Vincent H. Reid. (US F&WS, Nacagdoches, Texas.) WILDLIFE IMPLICATIONS OF HARDWOOD AND BRUSH CONTROLS. Trans. 21st N. Am. Wildl. Conf. p. 127-140. 1956.

Much evidence is cited to show how great and increasingly large are the areas of range and forest that are being treated with herbicides and other control agents to control oaks and other woody plants that are valuable, if not indispensable, to various forms of wildlife. We should know much more about the wildlife effects of these changes. We also need to know much more about how to use these plant-control measures for the benefit of wildlife. The responsibility apparently lies with professional wildlife workers. Useful list of 143 references is provided.

Jenkins, Ben C. (Mich. Dept. Cons.) WILD LAND MANAGEMENT AND CHEMICALS. Mich. Cons. 25(5): 18-20, 2 photos. Sept.-Oct. 1956.

Mich. has found aerial application of herbicides useful for converting certain low-grade aspen stands into lush fields of sprouts that are fine for deer. Repeated applications are useful for converting areas to grassland and keeping them that way, which is desirable for sharptail grouse management in Mich.

MAMMALS--GENERAL

Brand, Raymond H. (Westmont Coll.) A PROTECTIVE DEVICE FOR REDUCING TRAP DISTURBANCE. J. Mamm. 37(3): 428-431, 1 fig. Aug. 1956.

Of value in quantitative studies of small mammals when traps are being disturbed by larger animals. Consists of rectangular aluminum tube 4' long and 4" in diameter. Tube is wired to stakes and trap is placed inside. Entrances to tube have small holes through which wires are passed at intervals suitable for exclusion of larger, unwanted species.

Ealey, E. H. M., and G. M. Dunnet. (Wildl. Surv. Sect., C.S.I.R.O., Woodstock Field Sta., via Port Hedland, W. Aust.) PLASTIC COLLARS WITH PATTERNS OF REFLECTIVE TAPE FOR MARKING NOCTURNAL MAMMALS. C.S.I.R.O. Wildl. Res. 1(1): 59-62, 1 fig. Sept. 1956.

Summary: "A new method of marking mammals, by means of plastic collars bearing individual patterns of 'Scotchlite' reflective tape, is described. It enables individual identification to be made by day, or by night in the beam of a spotlight. Its use in field studies of two marsupials is described."

Marlow, B. J. (Wildl. Surv. Sect., C.S.I.R.O., Canberra, Aust.) CHLORAL HYDRATE NARCOSIS FOR THE LIVE CAPTURE OF MAMMALS. C.S.I.R.O. Wildl. Res. 1(1): 63-65. Sept. 1956.

Summary: "Narcosis was induced in the kangaroo...by the addition of chloral hydrate to water troughs. The optimum strength, 5 oz in 8 gal, caused no deaths and gave about 4 hours' anaesthesia, during which the animals could be freely examined. On recovery, they showed considerable discoordination, but subsequent observation showed that narcosis had no permanent ill-effects." The method worked on animals of various sizes and ages. Higher drug concentrations caused some deaths, but these apparently could be prevented by flushing stomachs.

Meyer-Holzapfel, Monica. DAS SPIEL BEI SÄUGETIEREN. Handbuch der Zoologie (Berlin) vol. 8, pt. 10, no. 5: 1-36, illus. 1956. [From J. Mamm. 37(4).]

Svihla, Arthur. (U. of Wash.) THE RELATION OF COLORATION IN MAMMALS TO LOW TEMPERATURE. J. Mamm. 37(3): 378-381. Aug. 1956.

"Our experiments show that insofar as heat conservation at low temperatures is concerned there is no difference between white and dark colored rats [albino and black-dyed albino R. norvegicus]. Hence in this case, at least, the relation of white coloration to white background can best be explained on the basis of natural selection."

MAMMALS--FAUNAS AND MANUALS

Baker, Rollin H. (Mich. State U.) MAMMALS OF COAHUILA, MEXICO. U. Kans. Publ., Mus. Nat. Hist., 9(7): 125-335, 75 maps. June 1956.

The fact that Coahuila shares a long border and many species with the U. S. makes this monograph doubly welcome. Only through such works as this are the n. states of Mexico now coming to be as well known scientifically as they should have been a generation ago. Baker, building on much recent field work, presents a valuable report. The bulk of it is an annotated list that contains data on distribution, measurements, comparisons, and nomenclature and also notes on status, habitat, and life history. There is a map for almost every form. Introductory sections take up topography, climate, life zones, vegetation areas, derivation of the fauna, topography and filter-barriers, conservation of mammals in Coahuila, and gazetteer. Unfortunately, there is no key and there are no drawings to aid in identification. A state fauna that does not provide for identification has maximum usefulness to only a few experts in large museums. Conservation-wise, the picture in Coahuila is mixed. Only bison, elk, and grizzly are exterminated, but several other species are on the downgrade from overhunting, overtrapping, control efforts, and competition with livestock. Overhunting is common, especially near towns and mining camps. Apparently there is heavy sport-hunting pressure from non-residents in some areas. On the other hand, some landowners are giving their game suitable protection and there is at least 1 progressive sportsmen's club. More of these, and better law enforcement, are needed. Natural habitats have been changed in many places, but rugged topography and lack of water have kept various areas in relatively natural condition.

Benton, Allen H., and Richard F. Krug. (N. Y. Teach. Coll., Albany.) MAMMALS AND SIPHONAPTEROUS PARASITES OF RENSSELAER COUNTY, NEW YORK. N. Y. State Mus. & Sci. Serv. (Albany) Bul. no. 353. 1-22 p., 6 figs. Sept. 1956.

Summary: "Twenty-five species of small mammals were collected...during 1953 and 1954. Nineteen species of fleas were found to infest these mammals. Host preferences and ecological distribution are noted for the various species of fleas. Taxonomic and distributional notes on several species of mammals are included."

Brodrick, Harold J. WILD ANIMALS OF YELLOWSTONE NATIONAL PARK. 2d. ed. Yellowstone Libr. & Mus. Assn., Yellowstone Interpretive Series no. 1. vi + 69 p., map & many sketches. 1954.

Processed, paper-bound booklet intended chiefly for park visitors. Gives general, popular information about the more conspicuous mammals and tells where they can be found. Other species of mammals known from park are at least listed, so the book has some value as a local checklist.

Cowan, Ian McTaggart, and Charles J. Guiguet. THE MAMMALS OF BRITISH COLUMBIA. B. C. Prov. Mus. (Victoria), Handbook no. 11. 1-413 p., 53 maps, 103 "plates," 29 figs. 1956. $1.00, paper.

Good semitechnical handbook with keys, range maps, drawings of most species, and illustrations of diagnostic features. Marine mammals are included. For each of the 126 full species there is a brief description, statement of habitat, and concise review of biology. For subspecies, distinctions are pointed out in a general way, some measurements are listed, and distribution is given in good detail. Taxonomic notes are provided for a number of forms under "Remarks." Introductory sections of the book include descriptions and map of biotic areas of B. C. The authors have studied the complex mammalian fauna of B. C. for many years and they have produced a useful, reliable reference that will be valuable to both beginners and professionals. Their book certainly is a good buy for anyone interested in mammals of the Northwest. Being only slightly larger than a Peterson field guide, the book should be handy for field use.

Manville, Richard H. THE MAMMALS OF SHENANDOAH NATIONAL PARK. Shenandoah Nat. Hist. Assn. (Shenandoah Natl. Park, Luray, Va.) Bul. no. 2. 1-69 p., illus. 1956. $1.00.

Well-printed and well-illustrated popular booklet. One section tells of history of mammals in the park. The largest section takes up mammals by species and gives popular descriptions and notes on natural history. A technical checklist by Paul G. Favour, Jr. summarizes data on status and distribution. The bulletin should be useful for educational work in and near the park, and it has reference value for anyone concerned with ranges and status of species of the area.

MAMMALS--FAUNAS AND MANUALS--Continued

Mumford, Russell E., and Charles O. Handley, Jr. (Mus. Zool., U. Mich.) NOTES ON THE MAMMALS OF JACKSON COUNTY, INDIANA. J. Mamm. 37(3): 407-412. Aug. 1956.
Annotated list with data on status, habits, and taxonomy.

Werner, William E., Jr. (Blackburn Coll.) MAMMALS OF THE THOUSAND ISLANDS REGION, NEW YORK. J. Mamm. 37(3): 395-406, 1 photo. Aug. 1956.
Mammals of the mainland and of 10 islands of various sizes and degrees of isolation were studied. Occurrence of species is discussed in connection with their winter habits, swimming ability, space requirements, etc. Microtus pennsylvanicus proved to be the best colonizer; it reached and populated even small, isolated islands of apparently unfavorable habitat.

Yates, Robert Doyle. THE MAMMALS OF TUSCALOOSA COUNTY, ALABAMA. M. S. thesis, U. of Ala. 193 p. 1956.
Thirty-five spp. and ssp. of mammals were collected in Tuscaloosa Co. Data on their distribution, ecology, habits, and measurements are presented. Fourteen additional spp. which should be expected from the county are also discussed.--Ralph L. Chermock.

MAMMALS--POPULATIONS, HOME RANGES, COMMUNITIES

Brown, L. E. (Imp. Coll., U. of London, Eng.) MOVEMENTS OF SOME BRITISH SMALL MAMMALS. J. Anim. Ecol. 25(1): 54-71, 9 figs. May 1956.
Summary: "1. The movements of Apodemus sylvaticus sylvaticus, Clethrionomys glareolus brittanicus and Microtus agrestis hirtus have been examined in various ways from data obtained during 'mark and release' live trapping experiments. 2. Averages of trap-revealed ranges (Manville 1949) for males trapped five or more times were for Apodemus 3092 sq. yd for Clethrionomys 2144 sq. yd and for Microtus 1162 sq. yd. Females occupied proportionately smaller areas. Results of home ranges using the minimum area method and the external boundary strip method are also considered. 3. Behaviour in the populations examined was not uniform. 'Stay at homes' and 'wanderers' were both present, contributing to a wide range in the types of movement examined. A larger proportion of the animals, however, showed restricted activity. Taking as an estimate of movement the distance between captures from one day's trapping to the next, 73% of the Apodemus and Clethrionomys moved less than 30 yd and 92% moved less than 60 yd, 55% of the Microtus moved less than 10 yd and 92% moved less than 30 yd."

Christian, J. J. (Nav. Med. Res. Inst., Bethesda 14, Md.) EFFECT OF POPULATION SIZE ON THE ADRENAL GLANDS AND REPRODUCTIVE ORGANS OF MALE MICE IN POPULATIONS OF A FIXED SIZE. Am. J. Physiol. 182(2): 292-300. Aug. 1955. [From J. Mamm. 37(3).]
See WR 82: 12.

Davis, David E., compiler. A MANUAL FOR ANALYSIS OF RODENT POPULATIONS. Privately lithoprinted. iii + 82 p., 10 figs. 1956. $1.00 from Div. Vert. Ecol., Johns Hopkins School Hygiene, 615 N. Wolfe St., Balt. 5, Md.
Purpose of this booklet is to describe for inexperienced workers a series of trapping procedures that will yield data about population size, reproductive rate, mortality rate, and movements of rodents. The first part describes in detail how to lay out a grid, make traps, and record data. The second part gives in elementary detail some statistical procedures for analyzing results. Additional parts describe variations in procedures that may be suitable for special cases and also technics for collection of ectoparasites, blood, and organs, and for estimation of seed consumption. Contributors are D. E. Davis, V. F. Flyger, F. K. Hilton, J. J. Christian, R. Mansueti, R. Traub, R. Lord, and Lowell Adams.--D. E. Davis.

MAMMALS--PARASITES AND DISEASES

Rausch, Robert, B. B. Babero, R. V. Rausch, and E. L. Schiller. (Arctic Health Res. Center, Anchorage, Alaska.) STUDIES ON THE HELMINTH FAUNA OF ALASKA. XXVII. THE OCCURRENCE OF LARVAE OF TRICHINELLA SPIRALIS IN ALASKAN MAMMALS. J. Parasit. 42(3): 259-271. June 1956.

Stagg, Gordon, W. S. Tanner, and John Lavender. (U. Utah.) EXPERIMENTAL INFECTIONS OF NATIVE ANIMALS WITH PASTEURELLA TULARENSIS. J. Infect. Dis. 99 (1): 34-37. July-Aug. 1956.
Various mammals native to Utah were subjected to infection by inoculations, contaminated food, and aerosols. 20 of 22 rodents failed to become infected from contaminated food but mortality was general with the other 2 methods. Two of 3 coyote pups sickened but did not die after aerosol exposure.

von Braunschweig, A. (Vet.-Path. Inst., Frankfurter Strasse 94, Giessen, Germany.) SIGNIFICANCE AND DISTRIBUTION OF BRUCELLOSIS IN WILDLIFE. Z. Jagdwissensch. 2(4): 227-229. 1956.
In German. English summary: "Brucellosis is a disease widely spread among domesticated animals, human beings, and game. With the latter it has been proved up to now in case of hares, roe deer, bison, chamois, and wapiti. A short introduction into the history of brucellosis is given, followed by a description of the chief pathological-anatomical changes in cases of brucellosis."

SHREWS, MOLES, BATS

Cockrum, E. Lendell. (U. Ariz.) REPRODUCTION IN NORTH AMERICAN BATS. Trans. Kans. Acad. Sci. 58(4): 487-511. 1955.
Compilation and analysis of published and original data for each species for which pertinent information is available. Facts on number of young, mating, and reproductive condition are tabulated, species by species, by date and location and with reference to source. Other aspects, including author's conclusions, are discussed in text. Comprehensive, detailed, review papers such as this one are all too infrequent; they are extremely useful to subsequent workers.

Hooper, J. H. D., and W. M. Hooper. (92 Station Crescent, Ashford, Middlesex, Eng.) HABITS AND MOVEMENTS OF CAVE-DWELLING BATS IN DEVONSHIRE. Proc. Zool. Soc. London 127(1): 1-26, 6 pl., 4 figs. Sept. 1956.
Much good data, especially for greater and lesser horseshoe bats.

Möhres, F. P., and Erwin Kulzer. ÜBER DIE ORIENTIERUNG DER FLUGHUNDE (CHIROPTERA--PTEROPODIDAE). Z. Vergleich. Physiol. 38: 1-29, illus. 1956. [From J. Mamm. 37(4).]

Möhres, F. P., and Erwin Kulzer. UNTERSUCHUNGEN ÜBER DIE ULTRASCHALL-ORIENTIERUNG VON VIER AFRIKANISCHEN FLEDERMAUSFAMILIEN. Zool. Anz., Verh. Deutschen Zool. Gessel., suppl. 19. p. 59-65. 1956. [From J. Mamm. 37(4).]

Ryckman, Raymond E. (Sch. Tropical Med., Loma Linda, Calif.) PARASITIC AND SOME NONPARASITIC ARTHROPODS FROM BAT CAVES IN TEXAS AND MEXICO. Am. Midl. Nat. 56(1): 186-190. July 1956.

Van Gelder, Richard G. (Am. Mus. Nat. Hist., N. Y.) ECHO-LOCATION FAILURE IN MIGRATORY BATS. Trans. Kans. Acad. Sci. 59(2): 220-222. 1956.
Summary: "Red bats occur in Kansas until October 7. Some migrating bats fail to locate stationary objects probably because the bats are confused by birds that are forced to lower altitudes by inclement weather."

RABBITS AND PIKAS

Bauer, Erwin A. RABBITS WHERE YOU WANT THEM. Field & Stream 61(3): 48-49, 6 photos. July 1956.
The Ohio Division of Wildlife has reared up to 18 cottontails per acre in 5-acre pens of fertile soil and good habitat. These rabbits remained in the vicinity of their pens after being tagged and released. The author recommends the method to sportsmen's clubs for increasing local rabbit populations. He also says, after listing methods that have failed to increase rabbits, "Improvement of habitat has been a success, but there are few places where it can be done." [Is there any larger number of places where big rabbit pens can be set up on fertile soil?]

Bull, P. C. SOME FACTS AND THEORIES ON THE ECOLOGY OF THE WILD RABBIT. N. Z. Sci. Review 14(5): 51-57, 2 graphs. May 1956.

A good review and synthesis of recent research on population dynamics of European rabbit in N. Z. Given especial attention are effects of habitat, weather, and parasites on reproduction, abundance, mortality and distribution. Good data on all of these are considered in the light of modern concepts. There is evidence that cycles of 11.5 and 14 years are setting in. The protozoan parasite, Eimeria steidae, may be partly responsible for fluctuations. Population declines, associated with high juvenile mortality, have occurred even in areas not treated for control. Increases have occurred elsewhere. Studies of Eimeria and 2 nematodes suggest that level of infestation depends on host resistance, which is influenced by stress, as postulated by Chitty for voles. Rabbits less than 9.5 months old were identified by degree of ossification of tibia. Further age breakdown was made by study of epiphyseal fusion in the vertebrae; complete fusion occurs during 3d year of life. Much mortality of young occurs before birth; in one study prenatal mortality was about 30%. Mortality for young of less than 120 days was 30% for every 26 days. In older rabbits mortality was 11% for 26 days; this would represent mortality of 80% per year. This population was not being controlled. Control efforts may stimulate breeding; it is essential to reduce a population to below the point of rapid breeding, i.e., to lowest arm of logistic curve. A grassy habitat that is strongly unfavorable to rabbits may develop if an area is favored by good rainfall and protected for a time from rabbits and sheep. Habitat changes may cause shifts of rabbit numbers and distribution; weather, parasites and rabbit numbers are important factors in these shifts.

Crunden, Charles W., and George O. Hendrickson. (Iowa State Coll.) EVALUATION OF TECHNIQUES IN ESTIMATING A MEARNS COTTONTAIL POPULATION. Proc. Iowa Acad. Sci. 62: 498-501. Dec. 1955.

"In summary, field research on the productivity and population dynamics of the Mearns cottontail was conducted from June 17 to December 4, 1953, on 80 acres of a dairy farm in Decatur County, Iowa. Data collected from the use of 50 live traps discriminately placed throughout the study area were analyzed by five different methods. Three methods were judged to give peak population estimates too low or too high, and too early or too late in the season. The fourth and fifth methods, thought to be most nearly accurate, employed modified forms of the Lincoln Index. They indicated a population of 80-100 late in August and early in September."

Dunnet, G. M. (Wildl. Surv. Sect., C.S.I.R.O., W. Aust. Regional Lab., Univ. Grounds, Nedlands, W. Aust.) GROWTH RATE OF YOUNG RABBITS, ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 1(1): 66-67. Sept. 1956.

Growth of young that were recaptured a number of times at Canberra is tabulated and growth formula is derived.

Ecke, Dean H., and Ralph E. Yeatter. (Santa Clara Co. Health Dept., San Jose, Calif.) NOTES ON THE PARASITES OF COTTONTAIL RABBITS IN ILLINOIS. Ill. Acad. Sci. Trans. 48: 208-214. 1956.

Occurrence of endo- and ectoparasites.

Linder, Raymond L., and George O. Hendrickson. (Iowa State Coll.) USE OF REARING COVER BY MEARNS COTTONTAIL. Proc. Iowa Acad. Sci. 63: 732-736. 1956.

80 acres of farmland in s. Iowa were studied Mar.-Sept. 1954. A population of about 18 rabbits increased to about 53 by July 31 and decreased to about 29 by Sept. 18. Seventy-two nests of the year were found. Twenty of these were incomplete, 26 were successful, and 26 were unsuccessful. Bluegrass dominated most nesting sites. Distance from nest to escape cover varied from 0 to 262', av. 64.7'. Number of young in 7 litters and 2 foetal counts varied from 5 to 8, av. 6.3. At least 15 litters, 80-90 young, were produced on the area. A fallow, grassy tract of 11 acres produced 7 of the litters. Drought and animal use affected hay fields adversely, and after that rabbits used a weedy cornfield heavily. Data are also given on nests, nest sites, sex ratio of young, dispersal of young, use of cover, persistence of fur dyes on tail, and causes of nest losses.

Lockley, R. M. OBSERVATIONS ON MYXOMATOSIS IN WALES IN 1954. Nature in Wales 1(2): 57-62. 1955. [From J. Anim. Ecol. 25(1).]
"A summary of a report submitted to the Nature Conservancy. Deals with ectoparasites, human and other agencies of spread, rate of natural spread, duration and lethality of epidemics, effects on other animal species and flora, etc."

Makepeace, Laura I. RABBITS / A SUBJECT BIBLIOGRAPHY. Denver Public Library (Denver 2, Colo.), Bibliographical Center for Research, Rocky Mountain Region, Special Bibliography no. 3. xii + 81 p., proc. 1956. $2.00.
A list of 3,485 titles on wild and domestic rabbits of the world. Hundreds of journals, most of them unfamiliar to wildlife biologists, in several languages were searched. These journals are listed. The titles cover a terrific range, from pathology and experimental embryology to natural history and management. The bibliography, therefore, will have value to workers in many fields. Presence of an author index facilitates use. The bibliography has many omissions and many typographical errors, but these are less irritating than the subject classification under which entries are arranged. Material on any subject may be found under any heading--a paper on lymphoid cells under "Anthropology," for example. Some papers are listed under more than one heading; others which should be are not. All a reader can do is to depend on the author index or else scan every one of the 3,485 titles and try to keep his patience. On the whole, the subject classification is far and away the worst we have seen; it is sure to discourage many potential users of the bibliography.--C. M. Herman & W. H. Stickel.

Mykytowycz, R. (Wildl. Surv. Sect., C.S.I.R.O., Canberra, Aust.) A SURVEY OF ENDOPARASITES OF THE WILD RABBIT, ORYCTOLAGUS CUNICULUS (L.) IN AUSTRALIA. C.S.I.R.O. Wildl. Res. 1(1): 19-25. Sept. 1956.

Phillips, W. M. THE EFFECT OF COMMERCIAL TRAPPING ON RABBIT POPULATIONS. Ann. Appl. Biol. 43: 247-257. 1955. [From J. Anim. Ecol. 25(1).]
"The effect of trapping on two rabbit [Oryctolagus] populations in western Wales was investigated from 1946 to 1949. Trapping removed 30-40% of the population. Breeding was intense from January to June, and also in the autumn; the sex ratio varied around a mean of 50%. Data are given on movements, foraging range and life expectation."

Redd, John Burton, Jr. ABUNDANCE AND DISTRIBUTION OF THE COTTONTAIL RABBIT AS AFFECTED BY LAND USE. M.S. thesis, Va. Poly. Inst. 83 p., illus. June 1956.

Rieck, W. (Inst. f. Jagdkunde, Univ. Göttingen, Hann.-Münden, Germany.) REPRESENTATION OF YOUNG HARES IN THE KILLS OF 1953 AND 1954. Z. Jagdwissensch. 2(3): 160-164, 2 graphs. 1956.
In German. From English and German summaries: Shooting of European hares was generally bad in 1953 and 1954. Young constituted only 14 to 43% of the bags. This small increase may have contributed to the poor hunting. Disappearance of young that had been present in summer was attributed to coccidiosis. This disease begins in late summer and autumn and is favored by wet weather. Shooting must be adapted to such conditions to avoid cutting down the stock to a level from which it can hardly recover.

Rowley, Ian. (Wildl. Surv. Sect., C.S.I.R.O., Canberra, Aust.) INDIVIDUAL MARKING OF THE RABBIT ORYCTOLAGUS CUNICULUS (L.). C.S.I.R.O. Wildl. Res. 1(1): 40-44, 1 fig. Sept. 1956.
Summary: "The use of a fur dye [I.C.I.'s Durafur Black R] to obtain individual markings of the rabbit...is described. Patterns were distinctive even after 13 weeks' exposure, and, compared with ear disks, the efficiency and frequency of sightings was considerably increased." Five areas of body were dyed: head, forequarters, girth, hindquarters, and back. Thus 25 combinations were possible. "Previous disk-marking techniques were modified to provide a larger (1 in.) tag used on both surfaces of the ear. No harmful effects were observed and recognition was improved."

RABBITS AND PIKAS--Continued

Southern, H. N. (Bur. Anim. Pop., Oxford U., Eng.) A BRITAIN WITHOUT RABBITS? Discovery 16: 186-189. 1955. [From J. Anim. Ecol. 25(1).]
"Considers some of the ecological consequences of the reduction of the rabbit population by the spread of myxomatosis. Covers not only the effects on grassland, crops and woodland, but also draws attention to probable food-chain disruptions and to the possible extension of grazing by other herbivores."

Valentincic, S. I. (Inst. f. Jagdliche Forschung, Vuka Karadjića 7, Belgrade, Jugoslavia.) RESULTS OF A TWO-YEAR STUDY OF IDEAL INCREASE OF EUROPEAN HARE ON THE ISLAND "BISERNI OTOK." Z. Jagdwissensch. 2(3): 152-160, 1 graph. 1956.
In German. From English summary: 279 female hares were examined. Occurrence of 5 litters a year was proved definitely; their periods of birth are stated. Second and third litters were the largest. Ideal increase for each female amounted to 10 young in 1954 and to 7.8 in 1955 [individual litters were small]. Meteorological factors had little influence on the ideal increase. The number of corpora lutea often was not identical with the number of embryos. Left horn of uterus was gravid more often than the right. Pregnancy and number of embryos did not depend on size or weight of female. Of 61 fetuses, 32 were female, 29 male.

Whittle, P. AN INVESTIGATION OF PERIODIC FLUCTUATIONS IN THE NEW ZEALAND RABBIT POPULATION. N.Z. J. Sci. Tech., sec. B, 37(2): 179-200, illus. 1955. [From J. Mamm. 37(4).]

RODENTS--MISCELLANEOUS

Batson, Jackie David. STUDIES ON RHOAD'S COTTON MOUSE, PEROMYSCUS GOSSYPINUS MEGACEPHALUS, IN ALABAMA. M. S. thesis, U. of Ala. 86 p. 1956.
A detailed study on the taxonomy, morphology, color variation, habits, ecology, and distribution of this species in Ala. Data on seasonal variation in color, and body measurements are included. A list of ectoparasites is also presented.--Ralph L. Chermock.

Brown, L. E. (Imperial Coll., London S. W. 7, Eng.) FIELD EXPERIMENTS ON THE ACTIVITY OF THE SMALL MAMMALS, APODEMUS, CLETHRIONOMYS AND MICROTUS. Proc. Zool. Soc. London 126(4): 549-564, 5 graphs. July 1956.
Study of patterns of activity throughout the day of free-living A. sylvaticus, C. glareolus, and M. agrestis. Variations in the patterns are pointed out and factors affecting the patterns are discussed. Comparisons are made with laboratory studies of related type.

Day, B. N., H. J. Egoscue, and A. M. Woodbury. (Ecol. Res., U. Utah, Dugway.) ORD KANGAROO RAT IN CAPTIVITY. Science 124(3220): 485-486. Sept. 14, 1956.
Study of reproductive cycle and social behavior finally led to successful matings and rearing of young in laboratory. Males and females were put together, in cages strange to both, only when females were ready for mating.

Le Blanc, J. S. (Army Chem. Med. Center, Md.) REARING OF LEMMINGS AT FORT CHURCHILL, MANITOBA. J. Mamm. 37(3): 447-448. Aug. 1956
Dicrostonyx groenlandicus: successful rearing methods, longevity in captivity, litter size, and population fluctuations in the wild (1949-55).

Linsdale, Jean M., and Lloyd Tevis, Jr. (Hastings Nat. Hist. Reservation, Carmel Valley, Calif.) A FIVE-YEAR CHANGE IN AN ASSEMBLAGE OF WOOD RAT HOUSES. J. Mamm. 37(3): 371-374. Aug. 1956.
Houses of Neotoma fuscipes in an area of the Hastings Reservation were restudied 5 years after a complete study. In the interim, the area was struck by severe drought, which killed many trees and bushes, by a flood, and by increasing reduction of bushes by exceptionally numerous deer. Also, bobcats increased. Things looked bad for the rats. But their houses increased from 95 to 139 and the population must have followed the same course. Explanation is thought to be that drought-killed willows provided an abundance of house material and building stimulus.

Oswald, Vernon Harvey. STUDIES ON THE LIFE HISTORY OF RICTULARIA COLORADENSIS HALL, 1916 (NEMATODA: THELAZIIDAE), A PARASITE OF PEROMYSCUS LEUCOPUS NOVEBORACENSIS (FISCHER). Ph. D. thesis, Ohio State U. 96 p. 1956. [From long abstract in Dissertation Abstracts 16(8).]

Pfeiffer, E. W. (Coll. of Idaho.) NOTES ON REPRODUCTION IN THE KANGAROO RAT, DIPODOMYS. J. Mamm. 37(3): 449-450, 2 photos. Aug. 1956.
On correlation of condition of vaginal orifice with reproductive status in D. ordii. The evidence indicates that this animal is a spontaneous ovulator and that ovarian hormones promote atrophy of the vaginal orifice instead of hypertrophy as in most rodents.

Rainey, Dennis G. EASTERN WOODRAT, NEOTOMA FLORIDANA: LIFE HISTORY AND ECOLOGY. U. Kans. Publ., Mus. Nat. Hist., 8(10): 535-646, 12 pl., 13 figs. Aug. 1956.
Good natural history study based on live trapping and other work near Lawrence, Kans. To this reviewer, the most interesting parts are on the ecological restrictions that control the woodrat at the margin of its range: The animal lives in narrow bands of habitat that is suboptimal at best. Where the bands become too broken, colonization is impossible under ordinary circumstances and the range ends. Weather extremes (such as prolonged ice cover) which occur at the edge of the range, may reduce the population greatly. Recovery is slow, partly because of the low reproductive rate and partly, perhaps, because of the limited quantity and quality of habitat. The house-building habit, however, is important in allowing the animal to occupy habitats in which it could not survive without houses. The paper gives much information on such topics as weights and measurements, habits, behavior, habitats in various parts of the range, reactions to weather conditions, structure and importance of houses, foods, social relationships, ectoparasites, predators, commensals, competitors, reproduction (includes table of litter sizes reported for various spp. of Neotoma), care and growth of young, survival of young (poor), pelages, numbers and population trend on study area, and analysis of factors affecting range limit in the region.

Tevis, Lloyd, Jr. (U. Calif., Davis.) BEHAVIOR OF A POPULATION OF FOREST-MICE WHEN SUBJECTED TO POISON. J. Mamm. 37(3): 358-370, 4 figs. Aug. 1956.
Important paper on behavior and control of Peromyscus in Douglas-fir area of Calif. It was found that bait-shyness can be utilized to protect planted tree seed. To describe the experiments in general, a 15-acre cutover was poisoned to reduce rodent population and then bait boxes containing 1080-treated Douglas-fir seed were put out. A few mice survived sublethal doses and thereby learned to avoid all Douglas-fir seed. Invaders usually visited the boxes and were killed or became bait-shy before digging up planted seeds. But even bait-shy residents eventually dug up planted seeds, especially newly planted seeds, and finally learned to eat them. They also learned to discriminate between heavily poisoned seeds (soaked in 6% solution of 1080) and untreated ones. Hence application of the method requires several precautions: 1. Poisoned seed must be present throughout the period when control is wanted. 2. The seed must be protected from rain by bait containers. 3. These containers should be evenly distributed over the cutover. No buffer area is needed. 4. Strength of 1080 solution used to treat seed should not be over 1%. 5. Planting should be done when rate of invasion is low and should be completed within 2 weeks after distribution of poisoned bait. Rate of invasion was found to be seasonal, with little invasion in Sept. and much in Nov. It was also found that 1 or 2 mice per acre could find and destroy all experimental plantings. Much individual variation in behavior of mice was noted.

van Wijngaarden, A., and H. de Vries. ZOU DE SYRISCHE GOUDHAMSTER, MESOCRICETUS AURATUS WATERHOUSE, ZICH IN NEDERLAND KUNNEN VESTIGEN? Verslag & Mededeel. Plantenziektenkundigen Dienst (Wageningen) 127: 224-227. 1955. [From J. Mamm. 37(4).]

Zambernardi, Joseph. WOODRATS OF THE GENUS NEOTOMA IN ALABAMA. M. S. thesis, U. of Ala. 76 p. 1956.
Habits, distribution, ecology and taxonomy of Neotoma magister and Neotoma floridana floridana in Ala. are described. Comparative graphs based on various skull and body measurements are presented. Seasonal variation in pelage is described in detail. A list of ectoparasites is included.--Ralph L. Chermock.

SCIURIDS

Arden, G. B., and Katharine Tansley. THE SPECTRAL SENSITIVITY OF THE PURE-CONE RETINA OF THE SOUSLIK (CITELLUS CITELLUS). J. Physiol. (Cambridge, Eng.) 130(1): 225-232. Oct. 1955. [From J. Mamm. 37(3).]

Dean, Harold Douglas. THE ECTOPARASITES OF THE GRAY SQUIRREL, SCIURUS CAROLINENSIS CAROLINENSIS, IN TUSCALOOSA COUNTY, ALABAMA. M. S. thesis, U. of Ala. 29 p. 1953.

Six species of ectoparasites were recorded from the gray squirrel: Orchopeas howardi, Hoplopleura sciuricola, Neohaematopinus sciurinus, Haemolaelaps glasgowi, Euhaemogamasus liponyssoides, and Amblyomma americana. Data on relative abundance are included.--Ralph L. Chermock.

Hoffman, Roger A., and Charles M. Kirkpatrick. (Purdue U.) AN ANALYSIS OF TECHNIQUES FOR DETERMINING MALE SQUIRREL REPRODUCTIVE DEVELOPMENT. Trans. 21st N. Am. Wildl. Conf. p. 346-354, 1 photo. 1956.

An analysis of the commonly employed field techniques for judging sexual development and age in male squirrels was made by histological examination of reproductive organs of 540 fox and gray squirrels collected in Wis. and Ind. over a period of years. It was found that (1) general appearance of external genitalia, (2) grouping by Cowper's gland sizes, or (3) measurements of reproductive glands, are poor criteria for determining sexual development, and are not reliable for separating adults from juveniles. Histological analysis is accurate about 86% of the time for determining stage of sexual development, but examination of both accessory glands and testis is necessary for the highest degree of accuracy.--C. M. Kirkpatrick.

Packard, Robert L. THE TREE SQUIRRELS OF KANSAS: ECOLOGY AND ECONOMIC IMPORTANCE. U. Kans. Mus. Nat. Hist. & State Biol. Surv., Misc. Publ. no. 11. 1-67 p., 2 pl., 10 figs. Aug. 1956.

Another good study of ecology and life history of gray and fox squirrels. Squirrels were studied chiefly by live trapping in 2 wooded areas (1 undisturbed, 1 heavily grazed and mixed with fields), by observations of activities, and by data obtained from hunters. Topics discussed include: distribution and habitats in Kans., populations of study areas, ratios and distribution of the 2 species, ecological preferences of the 2 species, sex ratios, age ratios, movements, intraspecific strife, time of activity in relation to light intensity and various weather features, seasonal food habits and preferences, weights in relation to season and food supply, nests and dens, diseases and parasites, predators, times of reproduction, litter size, habits of hunters, hunting statistics, biologically proper timing of hunting season, things that could be done to improve squirrel habitat. Some of the findings follow: The undisturbed area had more than twice as many squirrels as the grazed and hunted area. Winter carrying capacity of the former in 1954-55 was 1.18 squirrels per acre, while for the latter it was only 0.46. More males than females were found, both in litters and among adults. Gray squirrels were most active under lower light intensities than were fox squirrels. Fox squirrels were more versatile in food habits than grays. Den trees are more important to gray than to fox squirrels. Present open season is June 15-Nov. 30; the closing date could be changed to Dec. 10 but the opening date should be around Sept. 1, varying with times of breeding in different years. Most hunters feel that the season is now too long and the daily bag limit (8) is too large.

Uhlig, Hans G. (Soil Cons. Serv., Fergus Falls, Minn.) EFFECT OF LEGAL RESTRICTIONS AND HUNTING ON GRAY SQUIRREL POPULATIONS IN WEST VIRGINIA. Trans. 21st N. Am. Wildl. Conf. p. 330-337. 1956.

During 1948-54, 20,271 squirrel hunters were checked; 17,535 squirrels were aged and sexed; and 15,904 were weighed. Squirrel populations on Seneca State Forest (10,670 acres) were estimated by time-area counts, leaf nest counts, and hunting success during the first 1,000 gun hours. Formulas for total squirrel density per 100 acres were derived from leaf nests per 100 acres and kill per 1,000 acres during first 1,000 gun hours. Population density required for av. hunting success amounts to 47 squirrels per 100 acres. Sixty-five to 75% of total kill is usually made the first week. Over 50% of hunters fail to kill 1 squirrel per trip. Only 7% of hunters kill the daily bag limit of 4. Seasonal bag limits are unenforceable. Hunters take approximately 13% of the population in extensive forests during years of av. populations; 19% during periods of

high populations. Natural mortality removes 44-56% of population during winter. Optimum populations normally are not available until after Oct. 15. It is recommended that hunting season should not open before that time. More trails and roads in extensive forests are recommended to increase harvest.--Frank M. Johnson.

BEAVER

Shadle, Albert R. (U. Buffalo.) THE AMERICAN BEAVER. Animal Kingdom 59 (4-6): 98-104, 152-157, 181-185, 12 photos. July-Dec. 1956.

A 3-part popular article on natural history of beaver. Contains interesting information on many topics and includes original observations and some interesting photographs. It is not documented, however, so one cannot appraise source or basis of statements.

MUSKRAT AND NUTRIA

Harris, Van T. (US F&WS, SW. La. Inst., Lafayette.) THE NUTRIA AS A WILD FUR ANIMAL IN LOUISIANA. Trans. 21st N. Am. Wildl. Conf. p. 474-485, 2 graphs. 1956.

The economic and ecologic status of the feral nutria is discussed briefly. Estimates suggest populations as high as 3 to 4 nutria per acre. Data were collected from 276 nutria taken from June 1954 to May 1955. The samples were largely complete daily catches of trappers. Total length was in agreement with that of ranch-raised nutria, but wt. was less. There was no difference in wt. between sexes on the basis of length. Sixty per cent of nutria weighed 8-1/2-12-1/2 lbs. with mode of 11 lbs. Sixty-five per cent measured 33-5/8-38-1/2 in. in total length with mode of 37 in. Body length, tail length, and hind foot length are also given. The sex ratio was 85.6 males per 100 females. 107 females av. 4.4 embryos each. The av. varied with locality. Resorption of embryos occurred in 16% of females (4.7% of embryos). Increased resorption seemed to be associated with increased populations. No females under 29-3/4 in. in length contained embryos. 14% of females of this length or over were without embryos.--Author.

Reinig, Marshall. (405 E. Superior St., Duluth 2, Minn.) MORE AND MORE PEOPLE ASK ABOUT NUTRIA. Am. Fur Breeder 29(8): 10-11, 54, 3 photos. Aug. 1956.

The editor of a fur-growers journal sets forth the results of his investigation of the nutria business. In short, there is a vigorous and profitable breeding-stock racket, especially on the West Coast, in which "pedigreed" breeders are sold at exorbitant prices on the strength of highly misleading advertising. Male breeders may be sold for $150 and females for $800. Great pelt values are claimed, but the truth is: "Auction company executives and other well informed authorities in the fur market indicate that United States nutria production in recent years has been largely exported to Europe, where it has been used for coat linings and trimming. Ordinary Louisiana nutria pelts have sold in the New York market during the past year for as little as 60 cents per skin, with a high of $3.25 to $3.50 and an average of $2 each. During this same period, wild Argentine goods of the best quality have brought as much as $7.50 a skin." Some of the new mutations may or may not prove to be profitable. "It can only be reasoned, though, that any investment in nutria is most speculative and foolish to consider at the prices that apparently most breeding stock sellers are quoting."

Wilson, Kenneth A. (Currituck, N. C.) COLOR, SEX RATIOS, AND WEIGHTS OF NORTH CAROLINA MUSKRATS. N. C. Wildl. Resources Comm., Job Completion Rep., Proj. W-6-R. 17 p. + 3 p. appendix + 5 p. figs. Sept. 1956.

13,142 Ondatra z. macrodon from Currituck Co. were examined. Of these, 60% were brown and 40% were black. Of the 4,422 blacks, 2.4% were actually melanistic. Males outnumbered females in all age and wt. groups. Data on sex ratios in various age groups indicated a higher rate of mortality among adult females. Kits (wt. 22 oz. or less) comprised 6.6% of trapped animals examined. These kits probably represented late summer and fall litters. Wts. of subadults and adults (over 22 oz.) av. 2.38 lbs. Males av. 2.43 lbs., females 2.32 lbs. The

2 lb. 8 oz. group contained the greatest number of individuals of both sexes. The largest N. C. muskrat seen was a brown male of 4 lbs. 5 oz. The largest female weighed 3 lbs. 12 oz. Comparisons are made throughout with findings from extensive data from Md.

FUR ANIMALS, GENERAL

Ashbrook, Frank G., compiler. FUR CATCH IN THE UNITED STATES, 1955. US F&WS, Wildl. Leafl. 380. 3 p. Sept. 1956.
Tabulation, by species and state, of fur animals caught in 1954-55 or 1955. Only partial data are available for a number of states.

Hammel, H. T. THERMAL PROPERTIES OF FUR. Am. J. Physiol. 182(2): 369-376. Aug. 1955. [From J. Mamm. 37(3).]

Newby, Fletcher E. (Mont. Dept. Game.) TECHNIQUES USED IN MANAGEMENT OF MONTANA FUR ANIMALS. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 161-172. 1956.
Provides data on age and sex ratios of beaver, mink, and marten; tells how statistical information on fur animals is gathered and used; and describes how a flexible regulatory system is used to increase, decrease, or distribute trapping pressure on a given population or sex. The system is based on biological and statistical facts and seems to work admirably. Beaver catches are up and are better distributed. Marten regulations were liberalized, except for 1 heavily trapped area, to spread trapping into neglected areas and increase take. Yield from 1 heavily trapped area was 1 marten per 1.2 sq. mi., which is exceptionally high. Areas not recently trapped for marten had ratio of only 18 juveniles per 100 adults, while a heavily trapped area had 58 juveniles per 100 adults. Male marten predominate in catches unless intensive pressure is applied; a catch consisting of 70% males is thought to represent relatively light trapping pressure. Live-trapping studies and restocking of marten are under way. Suggestions are given on containers for handling and transporting marten.

Yocom, Charles F., Wm. A. Stumpf, Kennedy M. Perkins. (Humboldt State Coll.) STATUS OF BEAVER FORMERLY INTRODUCED INTO THE MAD RIVER AND RIVER OTTER IN NORTHWESTERN CALIFORNIA. Murrelet 37(2): 18-19. May-Aug. 1956.
A survey located 22 active colonies of beavers on the Mad River and some of its large tributaries. All the beavers were bank-dwellers. Beavers of the river system are believed to be at carrying capacity and in need of harvest. As to otters, field work of the last 3 years indicates that otters are relatively common in Del Norte and Humboldt counties.

RACCOON, RINGTAIL, COATI

Marshall, William H. (U. Minn.) SUMMER WEIGHTS OF RACCOONS IN NORTHERN MINNESOTA. J. Mamm. 37(3): 445. Aug. 1956.
"In summary, average weights of raccoon obtained during the summer months over a period of eight years in three northern Minnesota localities for twenty-seven males, thirty-two females, and fifty-five juveniles, clearly indicate that animals from this area are exceptionally heavy when compared to data from Michigan."

Stains, Howard J. THE RACCOON IN KANSAS, NATURAL HISTORY, MANAGEMENT, AND ECONOMIC IMPORTANCE. U. Kans. Mus. Nat. Hist. & State Biol. Surv., Misc. Publ. no. 10. 1-76 p., 4 pl., 14 figs. July 1956.
An extensive type of study that touches on almost all possible topics but is heaviest on food habits, data from hunters and trappers, and amount of activity in relation to weather. Among other topics considered are: weights and measurements, habitats in e. and w. Kans., recent rise in population, breeding, litter size, sex ratio, identification of age groups, parasites (extensive list from literature), diseases (histoplasmosis and a distemper-like disease were encountered and may have reduced population), hunting and trapping statistics, and what can be done for raccoons by way of regulation and habitat improvement.

Highest raccoon populations occur where corn is grown; corn is most important food item. Raccoons in Kans. use ground dens more often than tree-holes, largely because of paucity of trees. Breeding occurs Dec.-June, with peak in Feb. Most litters are born Apr.-May. Litter size is 4-7, av. 4.6. Av. wt. of 559 'coons was 17.6, with males av. 2 lbs. heavier than females. Animals from fertile soils were heavier. Air temperature is a great factor influencing activity. The av. 'coon hunter takes about 28 'coons per year. Some 35,000 persons in Kans. participate in 'coon hunting. Hunts av. 3.9 hrs. in duration and 4.2 mi. in ground covered. A preseason dog-training period is opposed by about half the hunters and by author. Hunting season should open Nov. 15 rather than Oct. 1. Bibliography of 9 pages.

MUSTELIDS

Dougherty, Ellsworth C., and E. Raymond Hall. (Sch. Med., U. Calif., Berkeley.) THE BIOLOGICAL RELATIONSHIPS BETWEEN AMERICAN WEASELS (GENUS MUSTELA) AND NEMATODES OF THE GENUS SKRJABINGYLUS PETROV, 1927 (NEMATODA: METASTRONGYLIDAE), THE CAUSATIVE ORGANISMS OF CERTAIN LESIONS IN WEASEL SKULLS. Revista Iberica de Parasitologia (Granada, Spain), Tomo Extraordinario. p. 531-576, 8 figs. Mar. 1955.

Thousands of skulls of Am. weasels were studied to determine incidence and distribution of the frontal lesions caused by these worms. The lesions were rare to absent in very dry regions and very cold regions. Presumably this reflects lack of molluscan intermediate host in such regions.

Kissen, Abbott Theodore. STUDIES ON THE EMBRYOLOGY OF THE MINK. Ph. D. thesis, Ohio State U. 98 p. 1956. [From long abstract in Dissertation Abstracts 16(8).]

Describes development at 13 horizons (stages) which extend from the 1-cell stage to a stage in which most structures are fairly well formed.

Quick, Horace F. (U. Maine.) ANALYSIS OF MARTEN EXPLOITATION AS CRITERIA OF MANAGEMENT. Trans. 21st N. Am. Wildl. Conf. p. 355-363, 3 graphs. 1956.

Effect of trap spacing and length of trapping period on sex ratio, age ratio, and species composition of fur catch. Concepts are based on author's study of commercial trapping near Ft. Nelson, B. C., and Newby's live trapping in Mont. In commercial marten trapping, first part of season yields mostly males. Proportion of females gradually rises; sex ratio becomes even in 3rd month and remains essentially even. Exhaustive trapping over a period of years removes most adults; these are replaced by influx of young, which are more prone to shift range than adults, so catches on exhaustively trapped lines consist mainly of young. Males usually are caught in larger numbers than females. This is because they range more widely and hence are exposed to more traps. Consequently, trap spacing is important in determining sex ratio of catch. With a given trap spacing, species with large home ranges are exposed to more traps than are species of small home ranges; the species with large home ranges therefore have greater chance of capture. If we wish to exploit a species that has small home ranges, we need more numerous trap lines and closer trap spacing. On the other hand, if we wish to prevent overtrapping of species with large ranges, we need fewer lines and wider trap spacing. The decision must be based on what species are present and on their relative values. These facts all suggest that control of trap spacing and control of length of trapping season can be regulated to produce a variety of results and different degrees of exploitation.

DOGS, WOLVES, FOXES

Crisler, Lois. (Crag Cabin, Lake George, Colo.) OBSERVATIONS OF WOLVES HUNTING CARIBOU. J. Mamm. 37(3): 337-346. Aug. 1956.

Summary: "It appears to us that wolves have great difficulty catching healthy adult caribou, and even calves are not often overtaken except in the confusion of a large herd. At least half of the kills that we observed involved crippled or sick caribou, whose incidence is in the neighborhood of 1.8% among

stragglers and even lower among the main herds. Presumably, therefore, predation was highly selective for unhealthy individuals." The paper includes considerable interesting information on observations of wolf and caribou behavior in Alaska.

Egoscue, Harold J. (Ecol. Res., U. Utah, Dugway.) PRELIMINARY STUDIES OF THE KIT FOX IN UTAH. J. Mamm. 37(3): 351-357, 1 fig. Aug. 1956.
Methods of live trapping, description of young, habitat, travel records, breeding habits, den construction, partial list of foods, ectoparasites, mortality factors, status. The animals are not especially wary and are not much disturbed by presence of man and his works. An adult homed 20 miles; a juvenile traveled an equal distance from its first capture site. Breeding probably occurs in winter; birth usually occurs in Mar. or Apr. Families may remain together until Sept. Most dens were in shadscale flats of valley floors. Known adult population was about 1 pair per 3.6 sq. mi. "Modern predator control methods, i.e., the widely spaced '1080' stations and the coyote-getter lines set close to accessible roads have left large areas free of such devices. A general increase in kit fox numbers in western Utah has resulted."

Layne, James N., and Warren H. McKeon. (U. Fla.) NOTES ON RED FOX AND GRAY FOX DEN SITES IN NEW YORK. N. Y. Fish & Game J. 3(2): 248-249. July 1956.
Reports, for 146 red fox dens and 3 gray fox dens, data on habitat at site, nature of soil, distance from water, and estimated number of years used.

Mansueti, Romeo. (Md. Dept. Res. & Ed., Solomons.) CASE OF THE DISPLACED FOX. Md. Nat. 25(1-4): 3-8. 1955 [1956].
Semitechnical review of much of the evidence for the red fox of e. U. S. being the introduced Eur. fox.

Palmer, Ralph S. (N. Y. State Mus., Albany.) GRAY FOX IN THE NORTHEAST. Maine Field Nat. 12(3): 62-70, 1 set figs. July 1956.
Presents what is thought to be first recent record of gray fox for Maine, reviews historical and archeological evidence of occurrence of gray foxes in ne. states and provinces, and briefly discusses the red fox controversy. Gray foxes occurred as far ne. as parts of Maine and Ont. in colonial and precolonial times. They became scarce in much of the NE. Range of red fox expanded at about the same period. Author does not believe introduction of Eur. red fox had much if any effect on fox situation in Am. Grays have increased in the NE., mainly since 1930s, and are present where long rare or absent. This increase may be correlated with spread and increase of cottontail rabbits in the region. Present range limits of gray fox in NE. are outlined.

Robinson, Weldon B. (US F&WS, Denver 2, Colo.) DOES THE COYOTE CONTROL RODENTS, OR DOESN'T HE? Am. Cattle Producer. 4 unnumbered p., 3 figs., in reprint. Sept. 1956.
Robinson, who has long studied coyote-control problems for the F&WS, gives a nontechnical review of predation theory for laymen. At the end, answering the question propounded in the title, he says: "As results of research accumulate, it is becoming increasingly evident that habitat rather than predation determines numbers of small mammals. As one writer phrased it, variations in natality are more important than those of mortality in controlling populations. Authorities will agree that coyotes and, in fact, all predators combined cannot hold rodents within such limits that economic damage is unimportant. But does killing coyotes worsen the situation? ...It would seem that at this point research needs to take over and furnish some badly needed answers. Fortunately the wheels are in motion to get those answers."

Sullivan, Edward G. (S. C. Wildl. Resources Dept.) GRAY FOX REPRODUCTION, DENNING, RANGE, AND WEIGHTS IN ALABAMA. J. Mamm. 37(3): 346-351. Aug. 1956.
Summary: "A total of 117 foxes was examined. Evidence indicates that the peak of the mating season is reached in February. The male gray fox is fertile from mid-November to mid-April. The average litter size for gray foxes is 3.8, with a variation from one to five young per litter. Dens were found in slab piles, hollow logs, under rocks and in the ground. All dens were within 1/4 mile of water. Returns of three tagged foxes, one of which was retaken twice,

showed distances of capture site of 1/2, 1/4, 1, and 4-1/2 miles. The average weights of gray foxes were: males 8.2 pounds and females 7.8 pounds. The heaviest fox handled was a male weighing 11.2 pounds. Average measurements are given." Over-all sex ratio was 98 males per 100 females, but catches consisted mostly of males in winter and females in summer.

BIG GAME, GENERAL

Altmann, Margaret. (Biol. Res. Sta., Moran, Wyo.) PATTERNS OF SOCIAL BEHAVIOR IN BIG GAME. Trans. 21st N. Am. Wildl. Conf. p. 538-544. 1956.
Patterns of social behavior in free ranging elk and moose of U. S. and of chamois and wild boar of Eur. were compared. Organization of the species in respect to space, leadership, communication, and reaction to disturbances was noted. Seasonal changes of groups were contrasted as to size of group and distribution of sexes. Role of males was traced from the winter situation to the peak of activity in the rutting season. The place of the young in the group was shown to vary in respect to activity, closeness to its mother, and herd integration. Enforcement of signals between mother and young, and the reaction to intruders was described. In the execution of games and play activity it was seen that locomotion in general and flight in particular were the leading topics. Playful fighting appeared in the young of chamois and in the wild boar pigs. Social test situations were used to reveal the social structure of the groups. Narrow passageways, river crossings, saltlicks, or storm shelters provided such information.--Author.

Altmann, Margaret. (Jackson Hole Biol. Res. Sta., Moran, Wyo.) PATTERNS OF HERD BEHAVIOR IN FREE-RANGING ELK OF WYOMING, CERVUS CANADENSIS NELSONI. Zoologica 41(2): 65-71, 5 figs. Sept. 1956.
This brief report on a long-term study discusses many aspects of elk behavior, migration, and social relationships.

Bubeník, A., and J. Lochman. (Radlická 22, Praha 16-Smichov, Czechoslovakia.) FOOD CONSUMPTION AND DAILY RHYTHM OF FOOD INTAKE OF ROE AND RED DEER. Z. Jagdwissensch. 2(3): 112-118, 2 figs. 1956.
In German. From English summary: An account of methods used by the Institute for Forestry and Wildlife Management in Czechoslovakia to solve fundamental problems of nutritional physiology of antlered deer: consumption and digestibility of foods, daily rhythm of feeding, and influence of different foods upon the course of feeding. A few results are pointed out which do not conform to experience with domesticated ruminants. Other results are discussed with reference to their influence on extent of damage caused by deer.

Bubeník, A., J. Lochman, and J. Prusek. BIOSTATISTICAL STUDY OF RED DEER BREEDING. Z. Jagdwissensch. 2(3): 142-148, 5 graphs. 1956.
In German. From English summary: By biostatistical investigation of the extensive range of red deer in Czechoslovakia, the biological conditions of equilibrium within the stock could be stated. It could be proved by correlative calculations that the course of rut as well as the composition of the stock are subject to a highly developed biological law, the influence of which upon the quality of deer and its environment cannot be denied. The practical significance of this information is discussed from the viewpoints of ecology, economics, forestry, and hunting.

Bubeník, A., R. Pavlansky, and J. Rerábek. TROPHIC OF ANTLER FORMATION. Z. Jagdwissensch. 2(3): 136-141, 6 figs. 1956.
In German. From English summary: Radioisotopes of P^{32} were used to study metabolism in bones of the skull and in developing antlers. A different intensity of metabolism of this element was determined within the bones of the cranium as well as within the antlers. This difference depends on the changing forms of the horns developing into antlers. These results were opposed to those of another series of experiments in which on one hand the growing antlers and on the other hand the bur and the diploe of the frontal bone were injured. The reaction to these injuries lead the authors to the theory that there are 2 growth centers for the formation of antlers and that these are dominated by superior centers, probably of the central nervous system. The influence of these centers on the trophic and the metabolism of antlers is discussed and it is shown how to apply these results to irregularities of antlers.

de Vos, A. (Ont. Agr. Coll., Guelph.) SUMMER STUDIES OF MOOSE IN ONTARIO. Trans. 21st N. Am. Wildl. Conf. p. 510-525, 4 figs. 1956.

The study was made on a lake in the Chapleau Crown Game Preserve, Ont., during the summers of 1952, 1953, and 1955. This is a partial report, and does not cover behaviour data, influence of weather factors upon moose, and aquatic food habits. A method was developed to mark moose with paint, but paint does not seem to be a suitable medium. Repeat observations and movements during the summer in the water are discussed. The majority of repeat observations were made at or near the same location and usually on the same or consecutive days. The percentage of adult bulls appears higher in the study area (58%) than under average Ont. conditions (51%). The calf crop appears poor as compared with adjoining regions, suggesting poor reproduction after continuous protection. Development of antlers and the shedding pattern of winter hair are discussed. Measurement of hoof imprints for determining sex and/or age has limited value.--Author.

Halazon, George C., and Helmut K. Buechner. (Kans. State Coll.) POST-CONCEPTION OVULATION IN ELK. Trans. 21st N. Am. Wildl. Conf. p. 545-554. 1956.

Analysis of 289 elk ovaries indicated that 66% of all pregnant animals examined had 2 corpora lutea. Data also indicate that in some populations this figure may approach 90%. Chronological collection of material suggested that the following sequence of events probably occurs in elk: (1) Development and maturation of 1 initial follicle; (2) ovulation of a single follicle and formation of a single primary corpus luteum; and (3) development and ovulation of one postconception follicle with formation of a secondary corpus luteum at approximately the time the embryo becomes macroscopic; (4) persistence of the corpora lutea throughout gestation.--Geo. Halazon.

Hancock, Norman V., and Jessop B. Low. (Utah Dept. Game.) AGING OF ROCKY MOUNTAIN ELK CERVUS CANADENSIS NELSONI BY DENTITION. Utah State Dept. Fish & Game. iii + 19 p., 11 figs. July 1956.

Based on known-age material. The system is described, illustrated, and outlined. Summary: "Elk can be accurately aged by the use of dental characteristics up to and including 3-1/2 years of age. However, beyond this age, the animals can be classed only with reservations. For management purposes, description beyond the 3-1/2 year-old age appears to be unimportant. Definite characteristics in elk dentition are present in the fall of the year during the hunting season which aid in classifying elk into calves, 1-1/2 year-olds, 2-1/2 year-olds, 3-1/2 year-olds, and possibly 4-1/2 year-olds."

Knott, Norman P. (Wash. Dept. Game.) POSSIBLE EFFECTS OF FERTILIZATION UPON FORAGE PRODUCTION AND GAME USE. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 207-209. 1956.

Well fertilized strips of both domestic and native vegetation on Wash. game lands proved extremely attractive to deer and elk--so much so that almost all use was concentrated on them. They even drew the game from private crops that were being damaged. The method has promise not only for lessening damage complaints, but also for increasing productivity of game lands and getting animals in better condition for winter. Knott points out in his introduction that "continued utilization of so-called over-browsed ranges by big game in preference to the use of similar species in adjacent areas could well be a result of higher nutritional levels brought about by browsing, rather than the time honored explanation that these heavily used areas are used out of habit." In other words, heavily browsed areas may be attractive because of their large amount of young, and therefore nutritious, growth.

Norberg, Elmer R. (Idaho Game Dept.) IDAHO'S EXPERIENCE WITH WINTER ELK INVENTORY VIA HELICOPTER. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 173-177. 1956.

Helicopter was compared with light airplane for big-game census work in rough, timbered country. Helicopter proved to be enough better to justify its greater rental cost, which was $80 as opposed to $15 per hour. It made possible much better data on numbers and vertical distribution of the game.

Petrides, George A. (Mich. State U.) BIG GAME DENSITIES AND RANGE CARRYING CAPACITIES IN EAST AFRICA. Trans. 21st N. Am. Wildl. Conf. p. 525-537, 1 graph. 1956.

Two areas, each 11 sq. mi., in the Themeda-Acacia grasslands near Nairobi, Kenya, were studied in 1954 during a 7-month cycle of dry and wet seasons to determine relationships between large grazing animals and natural vegetation. On one area, there were populations of 8 wild and 2 domestic species. These varied in abundance between 66 and 200 and av. 134 animals per sq. mi. On the other plot, numbers of 8 species varied between 5 and 73 and av. 33 per section. The greater abundance on the first area apparently represented a preference for food plants growing on the red lateritic soils over those of the calcareous black clays that predominated on the second plot. Seasonal abundance of animals was correlated with rainfall and availability of green forage. Using estimated av. wts., an av. of about 48,000 lbs. of grazing animals per sq. mi. was calculated for the first area. A corresponding figure of about 13,000 lbs. was calculated for the second. These E. Af. data are compared with carrying capacities calculated for various Am. big-game ranges. The Kenya veldt apparently can support 80-90 animals per sq. mi. in contrast to 20-28 animals per sq. mi. on Am. plains (or a few more where animals smaller than buffalo were present), but the wts. of grazing animals that can be carried on a sustained basis per sq. mi. are roughly equal in the 2 grassland areas. Big game populations in E. Af. are the basis of the valuable tourist and safari trades. On the basis of the population figures and other data, game animals perhaps should be given greater consideration on tribal lands as disease-resistant and easily-managed livestock. Several suggestions are offered for the management of big game in the grassland natl. parks of E. Af.--Author.

Rerábek, J., and A. Bubeník. (Bubeník: Radlická 22, Praha 16-Smichov, Czechoslovakia.) STUDIES ON THE MINERAL METABOLISM OF ANTLERED DEER BY MEANS OF RADIOACTIVE ISOTOPES. Z. Jagdwissensch. 2(3): 119-123, 1 graph. 1956.

In German. From English summary: Report of investigations on metabolism of phosphorus and iodine in antlered deer in various periods of their annual cycle. The experiments were made with isotopes P^{32} and I^{131}. They show that there is no reason to suppose that deer can store phosphorus as a reserve for antler formation. Only young, growing deer assimilate both inorganic phosphorus and the combined phosphorus from plants. With grown animals, assimilation of combined phosphorus from plants is more intensive. Iodine is absorbed intensively by the thyroid gland and is secreted as needed. As domestic ruminants show lacks of both elements, the authors discuss the importance of these elements to deer and ways in which they can be provided to deer.

Schneider, Francis. (Ore. Game Comm.) THE USE OF SUPPLEMENTAL SALT AS A BIG GAME MANAGEMENT TECHNIQUE IN OREGON. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 200-206. 1956.

Research studies described here indicate "that placing supplemental salt as a management technique to effect desired distribution of mule deer and elk herds is of little importance." Deer did acquire a taste for salt and used it in increasing amounts. They used it most heavily from late April to early July. There was no evidence of serious competition with livestock for salt blocks.

Till, C. E. (Colo. Game Dept.) ANTELOPE MANAGEMENT IN COLORADO: HISTORY AND TECHNIQUE. Proc. 36th Ann. Conf. W. Assn. State Game and Fish Comms.: 153-160. 1956.

Describes methods by which aerial surveys are used to ascertain population trends and age and sex ratios; tells how seasons, hunting units, and number of permits per unit are decided upon and how hunts are managed; gives tabular data on trend counts and kills (1945-55), age ratios, sex ratios, percentages of herd-increase, kills and hunter success for sex and age groups, kill by season of year and day of season. In brief, trend counts are made from air and ground in Jan. Sex and age ratios and herd-increase are determined by counts in Aug. Herd-increase averages 51%. Permits are issued in numbers equal to about half the count, and since the count is only partial, the kill is not too high. The regular hunting seasons are only 3 days long but hunter success is high--74 to 92%.

Ueckermann, E. (Tech. Zentralstelle für Forstwirtschaft, Am Höpen 149, Meckelfeld b. Hamburg, Germany.) STUDIES ON THE CAUSE OF DEBARKING BY RED DEER. Z. Jagdwissensch. 2(3): 123-131, 4 figs. 1956.

In German. From English summary: Nutritive value of tree bark approximates that of other game foods in the forest. Important is the high content of water, vitamins, and minerals. Bark is difficult to strip off in winter. At that season it is generally gnawed only when other foods are not available. In the growing season, bark is easily stripped and is often eaten when there is no scarcity of other foods. Density of game is growing and damage is generally increasing. Damage is greater in districts with bad stands than in those with good stands. To lessen damage from debarking it is necessary to limit the herd to a level that can be tolerated economically. But even at that level, and even when basic food conditions are improved, damage cannot be wholly avoided. Technical measures of protection are therefore indispensable.

Watson, Gordon W., and Robert F. Scott. (US F&WS, Anchorage, Alaska.) AERIAL CENSUSING OF THE NELCHINA CARIBOU HERD. Trans. 21st N. Am. Wildl. Conf. p. 499-509, 2 figs. 1956.

From 1948 to 1954, the Nelchina caribou herd of south-central Alaska was censused by aerial methods. During that period, estimates ranged from 4,000 to 13,000 animals. In 1955, using sound statistical methods, the herd was censused by air and the population set at about 40,000 caribou. Errors and false concepts of aerial censusing methods are discussed. The 1955 census was designed as an intensive representative sample, with 50% coverage being given to most of a 3,000 sq. mi. area. Analysis of results indicated a high degree of reliability for the population estimate. The 1955 results demonstrated that when careful thought, good planning, and adequate effort is devoted to the task, an aerial census can yield valuable information--often unobtainable in any other way.--G. W. Watson.

DEER (Odocoileus)

Blaisdell, James A., and Richard L. Hubbard. AN "OUTRIGGER" TYPE DEER FENCE. US For. Serv., Calif. For. & Range Exp. Sta. (Berkeley), For. Res. Notes no. 108. 1-3 p., 1 fig. Aug. 1956.

This fence, designed by A. L. Hormay, is only 4.5 ft. above ground but has an outrigger extension that slopes from top of fence to ground 8 ft. from fence. The idea is to keep deer from getting close enough to jump fence. "This type of construction has been used to exclude deer from study plots on three east Sierra deer winter ranges. It has given excellent results through three winters. To date, there has been no record of a deer crossing one of these fences." Cost was between 1 and 2 dollars per linear foot, but could be reduced somewhat by economies suggested. Outriggers might be attached to standard sheep fences. It is stated that deer have been known to dig under fences. This probably does not happen often enough to justify burying the lower part of the fence.

Caldwell, Shirling. (Ga. Game Comm.) CAPTURING DEER TAKES ON A NEW LOOK WITH THE USE OF DRUGGED DARTS. Ga. Game & Fish 5(11): 14-15, 23, 8 photos. Fall 1956.

Nicotine-treated darts shot from a Crossman air rifle are the latest wrinkle in capturing deer in Ga. for transplanting. Nicotine is now considered better than curare drugs or strychnine for the purpose. This narrative account does not give details of the method.

Dasmann, Raymond F. (Humboldt State Coll.) FLUCTUATIONS IN A DEER POPULATION IN CALIFORNIA CHAPARRAL. Trans. 21st N. Am. Wildl. Conf. p. 487-498. 1956.

A study was made, over 7 years, of a black-tailed deer population inhabiting fire-modified chaparral, or shrubland, in Lake County, Calif. The population exhibited a rapid increase following a fire. After 2 years a sharp decline set in, followed by a period of levelling off. During the period of increase there was excellent survival of fawns and old deer, and an influx of yearlings. In the period of decline, fawn survival was poor, older deer died, and yearlings as well as other deer moved out. Two types of die-off occurred, both explainable with reference to protein quality of the available forage. One, a summer-fall die-off, was severe and apparently unusual. The other, occurring in all

years, was a winter-spring die-off, apparently the more usual pattern. Stabilized shrubland will support a relatively stable deer population, the level of which is 2 or 3 times higher than that of dense, unmodified chaparral.--Author.

Fay, L. D., A. P. Boyce and W. G. Youatt. (Mich. Dept. Cons.) AN EPIZOOTIC IN DEER IN MICHIGAN. Trans. 21st N. Am. Wildl. Conf. p. 173-184, 1 map. 1956.
The epizootic occurred in white-tailed deer in late summer and fall of 1955. The principal autopsy finding was hemorrhages under skin, in muscles, and in internal organs. Bacteriological tests and mouse inoculations were negative. Captive deer injected with tissue materials from wild dead deer came down with an acute disease and died in 8 to 10 days. Subsequent findings indicate the infective agent is a virus. The disease appears to be specific for deer. There is evidence it is the same disease described by Shope, et. al., for the N. J. epizootic in 1955.--L. D. Fay.

Guenther, Stanley E. (Wash. Dept. Game.) AN EPIZOOTIC AMONG WHITE-TAILED DEER. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 210-214. 1956.
Describes outbreak of epizootic hemorrhagic disease near Cheney, Wash. The epizootic was limited to submarginal deer areas. Losses occurred in Aug. and Sept. and abated with heavy frosts. Death usually came after illness of only 1 day and from 5-10 days after inoculation. Symptoms and pathology are described. Mule deer were not affected although common in the area.

Holmgren, Ralph C., and Joseph V. Basile. (Intermtn. For. & Range Exp. Sta., Ogden, Utah.) RANGE REVEGETATION AND DEER ON THE PAYETTE. Idaho Wildl. Rev. 9(2): 10-13, 8 photos. Sept.-Oct. 1956.
Winter range is a limiting factor for deer on the S. Fork of Payette R. in Idaho. Browse plants of what winter range there is were seriously reduced by fires and insects. Tests showed that the only plant suitable for revegetation was bitterbrush. Suitable methods of seeding were worked out and are described. But deer browsed or trampled most seedlings. Trampling actually affected about 65% of the ground surface. Ways of protecting seedings were considered in detail. Only herd reduction by special late hunts on the wintering grounds seem practical. Reduction for several years would be needed, but after that period the carrying capacity would be much higher than at present.

Hundley, Louis Reams. THE AVAILABLE NUTRIENTS IN SELECTED DEER BROWSE SPECIES GROWING ON DIFFERENT SOILS. Ph. D. thesis, Va. Poly. Inst. 81 p., illus. June 1956.

Jones, Dale A., W. Leslie Robinette, and Odell Julander. (Utah Dept. Game.) INFLUENCE OF SUMMER RANGE CONDITION ON MULE DEER REPRODUCTION IN UTAH. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 195-199. 1956.
Shows that condition of summer range, not just winter range, is important in deer biology and management. Extreme areas were selected for comparison. The Antimony unit of s. Utah had extremely poor summer range and the Sublett unit of s. Idaho had excellent summer range. Ovulation rate was only 1.31 for the poor area and 1.95 for the good area. Pregnancy rate for yearling does was 0.62 as opposed to 1.55. Pregnancy rate for mature does was 1.42 as opposed to 1.96. Average weights also reflected the difference: fawns of the good area were 54% heavier. Yearling males were 35% heavier, 2-year-old bucks 31%, and older bucks 11%. Females were also heavier in the good area: yearlings 26%, 2-year-olds 22%, older does 3%. The paper gives tabular data on reproduction, weights, and browse conditions. Numbers of deer on which data are based are small, but results are believed to be representative.

Mace, Robert U. (Ore. Game Comm.) ANALYSIS OF OREGON'S BIG GAME STUDY PROGRAM. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 183-187. 1956.
Pertains only to mule deer studies. Kill data are obtained from hunters; they apparently do not provide reliable sex and age percentages. Population trends, herd composition, and winter losses are ascertained by field surveys. Range condition is followed partly by degree of utilization of bitterbrush, a key species. Range condition and trend are studied by 3-transect clusters; the goal is 200 clusters on 52 ranges. Changes are slow; only 1/5 of the

clusters will have to be studied in any one year. A specialized crew is assigned to this task. Uses and limitations of the various approaches are discussed. A table for 1948-55 gives data on total kills, population trend in terms of deer per mile, sex and age ratios, winter losses per mile, and percentage utilization of bitterbrush.

Mankins, Jerome V., and George A. Baker. (Calif. Dept. Game.) FACTOR ANALYSIS OF GROWTH OF CALIFORNIA MULE DEER ODOCOILEUS HEMIONUS CALIFORNICUS. Growth 20: 179-186. 1956.

Three body measurements and 5 antler measurements were made on mule deer killed by hunters during 3 years in an area near Fresno, Calif. Differences were found in the various measurements for the 8 age groups represented. Correlations between weight and each of the other measurements were tested by factor analysis. Girth, length, antler height, beam diameter, and number of points showed correlations with weight, but differed in importance with age groups.—L. F. Stickel.

Roberts, Hadley B. (US For. Serv., Grangeville, Idaho.) FOOD HABITS AND PRODUCTIVITY OF WHITETAILED DEER IN THE HATTER CREEK ENCLOSURE. M. S. thesis, U. Idaho. 1956.—P. D. Dalke.

Sanderson, Glen C. (Iowa Cons. Comm., Marion.) MULE DEER RECORD FOR IOWA. J. Mamm. 37(3): 457-458. Aug. 1956.

Severinghaus, C. W., and C. P. Brown. (N. Y. Cons. Dept.) HISTORY OF THE WHITE-TAILED DEER IN NEW YORK. N. Y. Fish & Game J. 3(2): 129-167, 8 figs. July 1956.

From abstract: History of deer in N. Y. is traced as background for understanding present condition and management needs. "While deer were plentiful in many localities in colonial times, they are generally not abundant there today—chiefly because such areas have been largely taken over for agricultural and urban development. Nevertheless, the total deer population of the State is much greater now than then. For the period since 1880 conditions are discussed separately and in some detail for the Adirondack, Catskill, and Central and Western regions, and Long Island. A summary of open seasons and hunting regulations is given, as well as a county by county record of the legal kill since 1900."

Swank, Wendell G. (Ariz. Game Dept.) PROTEIN AND PHOSPHORUS CONTENT OF BROWSE PLANTS AS AN INFLUENCE ON SOUTHWESTERN DEER HERD LEVELS. Trans. 21st N. Am. Wildl. Conf. 141-157, 7 graphs. 1956.

Shrub species common in Ariz. chaparral were tested for moisture, phosphorus and crude protein content. Plants were highest in moisture, phosphorus and protein during growing period. Moisture and nutritive content of plants from recently burned and railed sites in 1 area attained a higher level during the growing period; this level remained higher over a longer period than that of identical species from nondisturbed sites. Plants on the disturbed sites also received heavier use. Disturbance had no significant effect on plants from another area. Browse plants preferred by deer had a higher moisture, phosphorus and protein content during the dormant period than those used little or none. The phosphorus level of Ariz. chaparral browse plants appears to be satisfactory during the period of active growth, but during the dormant period the plants contain less than the minimum amount of phosphorus recommended for deer and livestock rations. Deer population levels in Ariz. chaparral are lowest where few plants of the most nutritious and highly palatable species occur. Levels are highest where deer summer in open ponderosa pine forests with an abundant understory of herbaceous material and winter at lower elevations where good growths of cliff-rose, mahogany and other palatable species occur.—Author.

Taber, Richard D. (MVZ, U. Calif., Berkeley.) DEER NUTRITION AND POPULATION DYNAMICS IN THE NORTH COAST RANGE OF CALIFORNIA. Trans. 21st N. Am. Wildl. Conf. p. 159-172, 4 graphs. 1956.

Comparisons were made between chaparral range and shrubland—which is chaparral that has been managed by burning and seeding. Data are given on forage production, trends in protein content of forage throughout year, food habits of black-tailed deer throughout year, deer populations, and deer weights. It

is shown that the shrubland produced far more forage, both herbaceous and woody, and that this forage had more protein. Shrubland produced more than twice as many deer and these deer were heavier at comparable ages. Yield of deer, in lbs. of dressed wt., was about 3 times as great in shrubland, and could be more than twice as great as this if the herd were harvested at the level of 20% of the July population. Deer yield in chaparral can be tripled either by heavier harvesting, which would mean shooting antlerless deer, or by converting chaparral to shrubland, which would triple production. However, when chaparral is converted to shrubland, herd control is necessary to prevent killing of preferred shrubs by overuse.

Whitlock, S. C., and Lee Eberhardt. (Mich. Dept. Cons.) LARGE-SCALE DEAD DEER SURVEYS: METHODS, RESULTS AND MANAGEMENT IMPLICATIONS. Trans. 21st N. Am. Wildl. Conf. p. 555-566, 2 figs. 1956.

Efficient management of most deer herds requires annual harvest of the surplus. Many states and provinces have adopted some form of antlerless season to permit such a harvest. In recent years there has been an increasing amount of evidence in Mich. and elsewhere that a high loss from accidental or illegal shooting may occur during a "bucks-only" season or when such a season precedes a short "any-deer" season. Information on such losses in Mich. has been obtained from the following sources: (1) Hunting season checks of relatively small areas have shown accidental or illegal losses ranging from 1/4 as much to as much as the legal kill. (2) A 1955 sample survey of the northern Lower Peninsula (about 18,000 sq. mi.) yielded an over-winter loss estimate of 32,500 deer, which is equal to about 3/4 of the legal kill in that area. A high proportion of these deer died from shooting and relatively few were starvation losses. Data are presented on: Sampling methods in large scale surveys; sex, age, and cause of death records from such a survey; and the possible combination of aircraft and ground searches for dead deer. From the standpoint of efficient deer herd management, antlerless deer seasons can effectively prevent large losses from starvation, but when such seasons are preceded by "bucks-only" hunting a sizeable waste of antlerless deer may be expected. Such losses probably cannot be prevented by law enforcement alone.--Lee Eberhardt.

MAMMALS--MARINE

Bartholomew, George A., and Ford Wilke. (U. Calif., Los Angeles.) BODY TEMPERATURE IN THE NORTHERN FUR SEAL, CALLORHINUS URSINUS. J. Mamm. 37(3): 327-337, 2 figs. Aug. 1956.

The excellent insulation of adult fur seals makes it difficult for them to remain cool enough for safety when active on land. Resting adults have av. deep body temperature of 37.7° C. Pups have av. rectal temperature of 38.2°. Temperatures rise and heat prostration may occur during sustained terrestrial activity, as during drives to killing grounds. Body temperatures higher than 41.5° are found only in animals incapacitated by heat exhaustion. Heat loss occurs chiefly through breathing and flippers. Flippers are waved in air to facilitate cooling. Bulls and cows often show signs of overheating in the course of normal activities. Pups, less insulated, seldom appear overheated but often shiver. When air temperature rises as much as 12° C., or overcast thins, bulls become much less active and some females take to water. "The relation of temperature regulation of fur seals to their aquatic and terrestrial distribution, to flipper size, vasomotor activity during dives, and location of testes is discussed."

Brown, David H., and Kenneth S. Norris. (Marineland, Calif.) OBSERVATIONS OF CAPTIVE AND WILD CETACEANS. J. Mamm. 37(3): 311-326, 3 photos. Aug. 1956.

Such topics as seasonal movements, locality records, feeding, schooling, mating, young, play, capture, care, size, proportions, and albinism are discussed for Lagenorhynchus obliquidens, Delphinus bairdi, Tursiops truncatus, Phocoenoides dalli, Globicephala scammoni, and Grampus rectipinna.

Duncan, A. (Marine Biol. Sta., Port Erin, Eng.) NOTES ON THE FOOD AND PARASITES OF GREY SEALS, HALICHOERUS GRYPUS (FABRICIUS), FROM THE ISLE OF MAN. Proc. Zool. Soc. London 126(4): 635-644. July 1956.

Edwards, Everett J., and Jeanette Edwards Rattray. "WHALE OFF!" THE STORY OF AMERICAN SHORE WHALING. Coward-McCann, N. Y. xxiii + 285 p., 19 photos, 1 map. 1956. $10.00.

The first part of this book consists of personal reminiscences of shore whaling off Long Island. It is a colorful picture of how the whaling was done and how the whalers and their families lived in the latter part of the 19th century. The second part is a history of shore whaling in the ne. U. S. from earliest days. It gives much information on the evolution of the business and on the men involved in it. The book has little biological reference value but should interest anyone concerned with history of whaling. First issued in 1932 and long out of print, the book is now reprinted with a few notes added.

Kleynenberg, S. E., and T. U. Makarovo, editors. THE WHALE FISHERY IN THE SOVIET UNION. Ministry of Fisheries Industry USSR, Moscow. 118 p. 1955. [From J. Mamm. 37(4).]

In Russian. Special articles by various authors.

Mohr, Erna. DAS VERHALTEN DER PINNIPEDIER. Handbuch der Zoologie (Berlin) vol. 8, pt. 10, no. 22: 1-20, illus. 1956. [From J. Mamm. 37(4).]

Paulian, Patrice. EXPLOITATION, DESTRUCTION ET PROTECTION DES PINNIPEDES. La Terre et la Vie (Paris) no. 1. p. 1-10, illus. 1956. [From J. Mamm. 37(4).]

Rand, R. W. THE CAPE FUR SEAL ARCTOCEPHALUS PUSILLUS (SCHREBER) / ITS GENERAL CHARACTERISTICS AND MOULT. Union S. Af., Dept. Comm. & Indus., Div. Fisheries, Investigational Rep. no. 21. 1-52 p., 39 figs. June 1956. (Reprint from "Commerce & Industry.")

Diversified technical paper, the first of a series on the species. Among topics discussed are: review of classification and distribution of species of Arctocephalus, weights and measurements, other physical characteristics, reproduction, ascertaining age by skull sutures, growth and development of young, characteristics of older animals, molt in different age groups, parasites and diseases, other mortality. Much quantitative information is presented in graphs and tables.

Slijper, E. J. (U. Amsterdam, Netherlands.) SOME REMARKS ON GESTATION AND BIRTH IN CETACEA AND OTHER AQUATIC MAMMALS. Hvalrådets Skrifter (Oslo) no. 41. 1-62 p., 22 figs. 1956.

In English. Well-documented review and analysis of the biology of birth in aquatic mammals.

Thompson, Seton H. ALASKA FISHERY AND FUR-SEAL INDUSTRIES: 1954. US F&WS, Stat. Dig. no. 37. iv + 70 p. 8 figs. 1956.

P. 53-70 concern fur-seal work. Data are given on kill, by-products produced, numbers of harem bulls, ages and lengths of seals killed, prices obtained for skins, and administrative matters. Harem bulls numbered 12,134; idle bulls numbered 8,158. An increase in idle bulls was noted at virtually all rookeries. Number of skins taken was 63,882. For research purposes, 658 females were included in kill. A total of 111,117 dead pups was found, an increase of 8.3% over 1953. Mortality of adults while on breeding grounds was low: 1.38% for males, and 0.084% for females. 10,000 pups were tagged and 179 tags from other years were recovered. Age determinations (from tooth ridges) show that kill consisted mainly of 3- and 4-year-old males. Av. price of finished skins was $84.20. Total value of skins sold was $4,346,992.

MAMMALS--OTHER GROUPS

Nesslinger, Carlita Leona. OSTEOGENESIS AND OSSIFICATION IN THE POSTNATAL VIRGINIA OPOSSUM, DIDELPHIS MARSUPIALIS VIRGINIANA KERR. Ph. D. thesis, Cornell U. 117 p., illus. 1955. [From abstract in Dissertation Abstracts 16(8).]

Nesslinger, Carlita L. (Cornell U.) OSSIFICATION CENTERS AND SKELETAL DEVELOPMENT IN THE POSTNATAL VIRGINIA OPOSSUM. J. Mamm. 37(3): 382-394, 7 figs. Aug. 1956.

Summary: "A gross study of bone development in the opossum was made using 234 specimens ranging in age from birth to 85 days. The specimens were cleared in potassium hydroxide, stained in alizarin red-S, and stored in glycerine. The order and approximate time of appearance of ossification centers was noted. Growth patterns and time of fusion is described. Six age classes were established on the basis of 34 specimens of known age."

Peterson, Randolph L., and S. C. Downing. (Roy. Ont. Mus., Toronto.) DISTRIBUTIONAL RECORDS OF THE OPOSSUM IN ONTARIO. J. Mamm. 37(3): 431-435, 1 map. Aug. 1956.

Includes discussion of invasion waves and mode of entry. Apparently most entry is by ice bridges or ice rafts.

BIRDS--GENERAL

Bourns, Thomas K. R. A STUDY OF CERTAIN ASPECTS OF THE PRECIPITIN REACTION AND ITS USE IN PROVIDING EVIDENCE FOR SYSTEMATIC RELATIONSHIPS AMONG BIRDS. Ph. D. thesis, Rutgers U. 78 p. 1955. [From long abstract in Dissertation Abstracts 16(8).]

Describes techniques, suggests improvements in them, and concludes that "The Galliformes appear to be among the most primitive of living birds" and that "The Wood Thrush is more closely related serologically to the American Robin than it is to the Olive-Backed Thrush, Gray-Cheeked Thrush, Hermit Thrush, or Veery."

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION

Adams, Claude T. COMPARATIVE OSTEOLOGY AND PHYLOGENY OF THE FAMILY ARDEIDAE. Ph. D. thesis, U. Fla. 193 p. 1956. [From long abstract in Dissertation Abstracts 16(9).]

Includes proposals of taxonomic changes at all levels of classification from family through subspecies.

Armstrong, E. A. THE ECOLOGY OF DISTRACTION DISPLAY. Brit. J. Anim. Behaviour 2: 121-135. 1954. [From notice by F. M. in Auk 74(1).]

"A detailed review of the literature on distraction display. 'Principles correlating the incidence of distraction displays and the type of nesting habitat are formulated.' Aspects of the adaptive value, evolution, and causation of these behavior patterns are discussed."

Bastian, J. W., and M. X. Zarrow. A NEW HYPOTHESIS FOR THE ASYNCHRONOUS OVULATORY CYCLE OF THE DOMESTIC HEN (GALLUS DOMESTICUS). Poultry Sci. 34: 776-788. 1955. [From notice by P. H. Baldwin, Auk 73(4).]

"A stimulating discussion of value to ornithologists interested in the process of egg production and factors affecting the number of eggs laid."

Beer, James R., Louis D. Frenzel, and Norman Hansen. (U. Minn.) MINIMUM SPACE REQUIREMENTS OF SOME NESTING PASSERINE BIRDS. Wilson Bul. 68(3): 200-209, 1 map. Sept. 1956.

Population studies were made on numerous islands in n. Minn. Conclusions: "The data gathered indicate that in some birds the minimum amount of space used by a pair to raise their young successfully may be much smaller when the boundaries are strictly physical barriers rather than invisible lines determined by intraspecific conflict. The three species observed reacted similarly to the situation of reduced space. The Song Sparrow on occasion successfully utilized islands less than one-tenth the size of the minimum area reportedly required on the mainland. The Red-eyed Vireo and the Yellow Warbler showed similar but less pronounced tendencies. The size of a territory is based upon a number of factors and not on single factors such as food."

Browne, K., and E. Browne. AN ANALYSIS OF THE WEIGHTS OF BIRDS TRAPPED ON SKOKHOLM. Brit. Birds 49(7): 241-257, 2 graphs. July 1956.

During 1947-53 over 4,000 birds of 69 spp. were weighed at this island off the British coast. Av. wts. for each sp. are given. Reasons for individual and intraspecific variation are discussed. Frequency distributions mostly had 2 peaks; these were attributed to sexual differences. Spring migrants weighed less than fall migrants. Residents reached peak wt. at end of nestling stage, lost wt. upon leaving nest, and gained into late autumn except for a drop during molt. Study of diurnal variation in wt. of residents in summer showed steady increase to peak in afternoon and slight drop in early evening. Migrants that were fatigued and underweight tended to remain on the island longer than others.

Dilger, William C. (Cornell U.) ADAPTIVE MODIFICATIONS AND ECOLOGICAL ISOLATING MECHANISMS IN THE THRUSH GENERA CATHARUS AND HYLOCICHLA. Wilson Bul. 68(3): 170-199, 12 figs., 1 col. pl. Sept. 1956.

Dorst, J. LES MIGRATIONS DES OISEAUX. Payot, Paris. 419 p., 94 figs. 1956. 1500 fr. [From notice by D. W. S., Ibis 98(3).]

"An excellent review of the whole field of bird-migration, fully documented and taking into account work published as late as 1955. About 150 pages are descriptive of the migrations performed by representative species from all parts of the world, including sea-birds. This part of the book is especially valuable, as it contains much information not previously assembled within the covers of one book. Following this are chapters dealing with special aspects such as height and speed of flight, the effect of weather, eruptive migrants, the physiological basis of migration, and orientation. These are all useful, up-to-date reviews, forming a well-balanced whole."

Howard, Len. LIVING WITH BIRDS. Collins, London. 256 p., 24 pls., 10 figs. 1956. 15s. [From long critical review by W. H. T. and R. A. H., Ibis 98(3).]

Miss Howard, noted for her stimulating book "Birds as Individuals" (see WR 75: 51) here presents more data on individual wild birds that she has known intimately. Emphasis is on individual peculiarities, which she considers so great that she deems generalizations about the behavior of a species to be impossible. She thus provides something of a counterbalance to the school of thought that tends to treat birds as stereotyped mechanisms; according to the reviewers, however, this school of thought has long since modified its views. Miss Howard also gives much attention to the arithmetical and other accomplishments of "Star, a Great Tit of genius." The reviewers point out that Miss Howard's approach is extremely anthropomorphic and that experimental and statistical controls are entirely lacking in her work. Miss Howard's books can be seriously misleading for laymen, but they can be highly suggestive to students of bird behavior who approach them with open (but not unquestioning) minds.

Lofts, B., and A. J. Marshall. THE EFFECTS OF PROLACTIN ADMINISTRATION ON THE INTERNAL RHYTHM OF REPRODUCTION IN MALE BIRDS. J. Endocrin. 13: 101-106. 1956. [From authors' summary in Ibis 98(3).]

Nero, Robert W. (Sask. Mus. Nat. Hist., Regina.) A BEHAVIOR STUDY OF THE RED-WINGED BLACKBIRD. II. TERRITORIALITY. Wilson Bul. 68(2): 129-150, 3 figs. June 1956.

"The present paper describes the formation, maintenance, size and structure of the male territory; female territorial behavior; and behavior of first-year (one-year-old) males, as observed in the vicinity of Madison, Wisconsin."

Sabine, Winifred S. (Ithaca, N. Y.) INTEGRATING MECHANISMS OF WINTER FLOCKS OF JUNCOS. Condor 58(5): 338-341. Sept.-Oct. 1956.

Schwartzkopff, J. SCHALLSINNESORGANE, IHRE FUNKTION UND BIOLOGISCHE BEDEUTUNG BIE VÖGELN. Proc. XI Congr. Internat. Ornith.: 189-208. 1955. [From notice by D. W. S., Ibis 98(3).]

"A review of hearing and the perception of vibration in birds."

BIRDS--MORPHOLOGY, PHYSIOLOGY, BEHAVIOR, MIGRATION--Continued

Simmons, K. E. L. STUDIES ON GREAT CRESTED GREBES. Avicultural Mag. 61: 3-13, 93-102, 131-146, 181-201, 235-253, 294-316. 1955. Reprints 5s from Avicultural Soc., 61 Chase Rd., Oakwood, London N. 14, Eng. [From notice by R. W. Storer, Auk 73(4).]

"This is the most important paper yet published on the behavior of grebes and may serve as a model for future work on other species. The figures showing the displays of the Great Crested Grebe are particularly valuable."

Various authors. [SYMPOSIUM ON TERRITORIES OF BIRDS.] Ibis 98(3): 339-530, illus. July 1956.

Long, important, detailed symposium on nature and function of both breeding and winter territories. Papers are: The biological significance of the territories of birds, by R. A. Hinde. Territory in the great crested grebe Podiceps cristatus re-examined, by L. McCartan and K. E. L. Simmons. The concept of territory in the partridge Perdix p. perdix, by T. H. Blank and J. S. Ash. Territory in the little ringed plover Charadrius dubius, by K. E. L. Simmons. The lack of territory in the redshank Tringa totanus, by W. G. Hale. On the functions of territory in gulls, by N. Tinbergen. Territory in the thick-billed nutcracker Nucifraga caryocatactes, by P. O. Swanberg. Territory in the genus Parus, by John Gibb. Territory in the wren Troglodytes troglodytes, by E. A. Armstrong. Territory in the blackbird Turdus merula, by D. W. Snow. Territorial activities of the American robin Turdus migratorius, by Howard Young. The territory of the wheatear Oenanthe oenanthe, by P. J. Conder. Territory in the pied flycatcher Muscicapa hypoleuca, by Lars von Haartman. Territory in the red-backed shrike Lanius collurio, by S. Durango. Territory in the meadowlarks, genus Sturnella, by W. E. Lanyon. The territorial behavior of the hawfinch Coccothraustes coccothraustes, by Guy Mountfort. Territory and individual distance in the chaffinch Fringilla coelebs, by P. Marler. Territorial behavior of the yellowhammer Emberiza citrinella and corn bunting E. calandra, by R. J. Andrew. Food, feeding habits and territory of the rock pipit Anthus spinoletta, by John Gibb.

Williamson, Francis S. L. (Arctic Health Res. Center, Anchorage, Alaska.) THE MOLT AND TESTIS CYCLE OF THE ANNA HUMMINGBIRD. Condor 58(5): 342-366, 9 figs. Sept.-Oct. 1956.

A detailed, substantial study of the annual cycles of behavior, molt, and testis, with discussion of climatic correlations.

BIRDS--MANUALS, FAUNAS, COMMUNITIES

Bailey, A. M. BIRDS OF MIDWAY AND LAYSAN ISLANDS. Denver Mus. Nat. Hist., Mus. Pictorial 12. 130 p., illus. 1956. $2.00. [From notice by R. W. S., Auk 74(1).]

"An important review of our knowledge of the birds of these islands, beautifully illustrated by photographs and a colored plate of the extinct Laysan Honey-eater (Himatione sanguinea fraithii). A bibliography, a list of plants, and a history of the islands add to its usefulness."

Brodrick, Harold J. BIRDS OF YELLOWSTONE NATIONAL PARK. Yellowstone Libr. & Mus. Assn., Yellowstone Interpretive Series no. 2. viii + 58 p., map & numerous sketches. 1952.

Complete checklist with indications of abundance and seasonal occurrence. Field marks are stated briefly; if this material is used with the many drawings, visitors to the park should be able to identify a good share of the birds seen. Hypothetical list is appended.

Pough, Richard H. AUDUBON WESTERN BIRD GUIDE / LAND, WATER, AND GAME BIRDS / WESTERN NORTH AMERICA, INCLUDING ALASKA, FROM MEXICO TO BERING STRAIT AND THE ARCTIC OCEAN. Doubleday & Co., Garden City, N. Y. xxxvi + 316 p., 32 color pls., 138 figs. 1957. $4.95.

614 species of birds occur in the area. The book gives full treatment to the 203 that are exclusively western. For the other 411, all that is given are range statements and references to Pough's eastern guides. This is a major difficulty with an otherwise useful, interesting, and attractive book. It must

be granted, however, that all species could have been treated equally only by giving much less information for each or by greatly enlarging the book. As it is, the book is of handy size and reasonable cost, considering that it has 340 good portraits in full color and 138 in black and white. Text for a species discusses identification, habits, voice, nest, and range in useful detail. Many of the sections on habits are unusually interesting. Numerous species accounts were contributed by H. L. Cogswell, J. T. Marshall, Jr., A. R. Phillips, and R. W. Storer. Other authorities also aided in preparation of the volume. The book has good accounts of sea birds. It is outstanding in the amount of information and illustration on Asiatic stragglers. On the whole, it can be recommended strongly to anyone who has or is willing to get Pough's eastern guides. A few minor criticisms may be made: Descriptions would have been improved by more comparisons. The tables of av. length and wing spread are of dubious value. Voice of the black-footed albatross is far from bell-like. Bill of Laysan albatross is not grayish but pale yellow to flesh colored. Feet of wedge-tailed shearwater are not yellowish but pink, as shown in plate. No doubt more points of this type could be found in accounts of unfamiliar species, but in our opinion they do not detract greatly from the value of the book.--C. S. Robbins and W. H. Stickel.

Pyle, R. L. ANNOTATED FIELD LIST OF THE BIRDS OF SOUTHERN CALIFORNIA. Aud. Center of S. Calif. (664 N. Durfee Ave., El Monte, Calif.) 40 p. 1953. [From notice by R. W. Storer, Auk 73(4).]

"Contains information on abundance and seasonal occurrence."

Yapp, W. B. THE SUCCESSION OF BIRDS IN DEVELOPING QUERCETUM PETRAEAE. Northw. Nat. (N. S.) 3: 58-67. 1955. [From J. Anim. Ecol. 25(1).]

"Bird populations in three areas in Wyre Forest representing stages in the development of high oak (Q. petraea) forest from oak-birch scrub were studied by means of line transects during April-June and October-March 1953, and the data obtained are given in tables and discussed. As the sere developed, the number of bird species and over-all densities increased and there was an increase in the number and variety of niches rather than a replacement of one set by another."

BIRDS--POPULATIONS & FLUCTUATIONS

Kendeigh, S. Charles. (U. of Ill.) A TRAIL CENSUS OF BIRDS AT ITASCA STATE PARK, MINNESOTA. Flicker 28(3): 90-104, 7 figs. Sept. 1956.

Population study based on a technique devised by the author. "This procedure differs from the Williams spot-map method of taking a bird census in that it marks territories linearly rather than areally (Kendeigh 1944). It differs from the usual strip censuses in that it requires replication of counts throughout the nesting season rather than computing population densities from a single count. The procedure also eliminates the error, pointed out by Hayne (1949), of using the average distance at which the species first comes to the observer's attention to represent the width of the census strip... Effective census distances at right angles to the trail varied from 25 to 100 meters for different species and these distances were used for converting the population densities of several species into number of territorial males (pairs) per 40 hectares (100 acres)."

Lack, David. (Oxford U., Eng.) VARIATIONS IN THE REPRODUCTIVE RATE OF BIRDS. Proc. Roy. Soc., Ser. B, Biol. Sci., 145(920): 329-333. July 1956.

From summary: "The clutch size of each species of bird is characteristic, and in general seems adapted to correspond with the largest number of young which can be successfully raised. Probably there is a small hereditary variation, which is explicable through rather larger clutches being favoured in some years and rather smaller clutches in other years. In addition, the same individual may lay a clutch of different size under different conditions. Thus in the species considered here, the average clutch varies with the time of year, in different years, with habitat and with age. There is circumstantial evidence for thinking that many of these differences are adapted to the conditions under which the young will later be raised, and one of them (in the swift) to conditions affecting the hen at the time of laying. If such variations were not, in general, adaptive, each species would presumably have an hereditarily fixed clutch size."

Salomonsen, F. THE FOOD PRODUCTION IN THE SEA AND THE ANNUAL CYCLE OF FAEROESE MARINE BIRDS. Oikos 6: 92-100. 1955. [From notice by D. W. S., Ibis 98(3).]

"'Notwithstanding the wide differences in time of arrival of the adult breeding-birds, in all species the nestlings hatch in a rather limited period, from early June to the end of July, only the Storm-Petrel continuing into August-September. Therefore, the entire feeding of the young takes place within the period of plankton production...' This situation is contrasted with that obtaining in the Tropics, where seasonal changes in the abundance of food are slighter and sea-birds appear to avoid competition by breeding at different times of the year."

Wynne-Edwards, V. C. LOW REPRODUCTIVE RATES IN BIRDS, ESPECIALLY SEA-BIRDS. Proc. XI Congr. Internat. Ornith.: 540-547. 1955. [From notice by D. W. S., Ibis 98(3).]

"Develops the thesis that 'slowly-breeding birds have evolved a series of interrelated adaptations, giving them a great measure of autonomic control of their numbers,' from which it would follow that in such birds the reproductive rate is adjusted to balance the death rate and not vice versa. The controversial question is raised of natural selection of the group as opposed to natural selection of the individual."

BIRDS--CONTROL, MORTALITY

Borg, K. (Veterinärmedicinska Anstalt, Stockholm 50, Sweden.) USE OF CHLORALOSE FOR DESTRUCTION OF INJURIOUS BIRDS. Z. Jagdwissensch. 2(3): 180-182. 1956.

In German. "Chloralose" (anhydro-gluco-chloral, $C_8H_{11}O_6Cl_3$) has proved very efficient for destroying crows and magpies in Sweden. Concentration employed was 0.27% (8 g. on 3 kilos of food). It has also been used to decimate pigeons in towns. The reaction time is 15-30 minutes for crows, 10-15 minutes for magpies. It is somewhat longer and more variable for pigeons--1/2 - 1 hour. The alpha isomer was used; the beta isomer is considerably slower in reaction time.--C. M. Herman.

Chubb, J. C. OBSERVATIONS ON OILED BIRDS, 1951-53. Northw. Nat. (N.S.) 2: 460-461. 1954. [From J. Anim. Ecol. 25(1).]

"The numbers of dead, oiled birds of each of fifteen species that were washed up on a stretch of seashore one mile long during 1951-53 are listed. Four waders probably became accidentally covered with oil after death. Diving birds appear to be most affected, since the low density of the oil prevents them from diving for food as well as from flying."

Emlen, John T., Jr. (U. Wis.) JUVENILE MORTALITY IN A RING-BILLED GULL COLONY. Wilson Bul. 68(3): 232-238, 1 fig. Sept. 1956.

An island colony was studied in n. Mich. Territories were small and tightly massed. Most deaths occurred when young got out of their own territories and were attacked by adults. Deaths of young were about 1.5 per nesting territory. Survival to fledging was about 0.67 young per territory. Published data suggest that this rate of production may be enough to maintain the population.

James, Pauline. (Pan American College, Edinburg, Tex.) DESTRUCTION OF WARBLERS ON PADRE ISLAND, TEXAS, IN MAY 1951. Wilson Bul. 68(3): 224-227. Sept. 1956.

More than 10,000 warblers and other small birds were killed on 1 cold, rainy night by flying into lights, wires, and buildings. This mass mortality apparently was quite local.

Laskey, Amelia R. (1521 Graybar Lane, Nashville 12, Tenn.) BIRD CASUALTIES AT SMYRNA AND NASHVILLE CEILOMETERS, 1955. Migrant 27(1): 9-10. Mar. 1956.

Sept. 24-25, 1955 brought suitable conditions for ceilometer mortality in Tenn. Two air fields were checked. Owing to author's warning, beam was turned off temporarily at 1 field and little mortality occurred. Weather bureau men at other field agreed to screen light but apparently were unable to do so; dead

birds were picked up by the sackful. Protest to Wash., through F&WS, brought order for all Air Force bases e. of Miss. R. to screen beams in Sept.-Oct. and whenever necessary. Commercial ceilometers are to be screened. Birds collected at ceilometers are listed.

Richardson, Frank. (U. of Wash.) SEA BIRDS AFFECTED BY OIL FROM THE FREIGHTER SEAGATE. Murrelet 37(2): 20-22, 1 photo. May-Aug. 1956.
Oil from a freighter wrecked on the Wash. coast caused death of more than 904 common murres and death or illness of more than 2,120 white-winged scoters. Limited numbers of other birds were also affected. Afflicted scoters tended to resort to creeks or pools above the beaches and it seemed some of these would survive. Certain lightly oiled birds seemed weakened, as if poisoned by ingesting oil in course of preening. Five birds were dissected and all had oil in intestines and gizzards.

Tordoff, Harrison B., and Robert M. Mengel. (U. Kans.) STUDIES OF BIRDS KILLED IN NOCTURNAL MIGRATION. U. Kans. Publ., Mus. Nat. Hist., 10(1): 1-44, 6 figs. Sept. 1956.
This is the best paper we have seen on making good scientific use of mass-mortality collections of birds. It presents examples of a surprising variety of analyses that can be made with such collections. Among topics treated are: separating immatures and adults by skull ossification (highly reliable for all passerines considered), relative numbers of the species involved, weights, fat supply in relation to migration, randomness of the sample, estimated numbers of migrants at time of the mortality, differential migration of sex and age classes, molt in relation to migration, size and weight differences in sex and age groups, and computation of longevity and survival from ratio of adults to immatures. Practical suggestions are given for collecting and processing mass-mortality samples. The methods discussed are applied to a sample of 1090 birds killed at a Topeka, Kans., TV tower in the fall of 1954. Biological results of the study are reported.

BIRDS--PARASITES AND DISEASES

Farr, Marion M. (US Dept. Agr., Beltsville, Md.) SURVIVAL OF THE PROTOZOAN PARASITE HISTOMONAS MELEAGRIDIS, IN FECES OF INFECTED BIRDS. Cornell Vet. 46 (2): 178-187. Apr. 1956.
Histomonas is the organism producing blackhead. The paper includes data on survival of 4 kinds of nematodes in droppings exposed on soil outdoors.

Jennings, A. R. DISEASES IN WILD BIRDS. Bird Study 2: 69-72. 1955. [From J. Anim. Ecol. 25(1).]
"Summarizes autopsy results on 224 wild birds over a period of three years. Where cause of death could be determined, bacterial and virus infections were operative in thirty-six and thirty-four cases respectively. Injury and chemical poisoning accounted for sixty-nine other birds."

QUAIL

Bethea, Locke, and Bruce Johnson. (Miss. Game Comm.) THE LESPEDEZA BICOLOR--A PROVEN TOOL IN QUAIL DEVELOPMENT. Miss. Game & Fish 20(2): 8-9, 5 photos. Sept. 1956.
165 of 167 landowners who had bicolor plantings stated that bobwhites used these plantings. Two surveys of hunters demonstrated that men who included bicolor plantings in their hunts bagged 1.0 or 0.2 more quail per hunt than those who did not. Suggestions are given for managing bicolor plantings.

Brown, Charles P. (N. Y. Cons. Dept.) DISTRIBUTION OF BOBWHITE QUAIL IN NEW YORK. N. Y. Fish & Game J. 3(2): 191-199, 1 map. July 1956.
Abstract: "The bobwhite quail was part of the native avifauna of New York, but disappeared from most of its range in the State during the latter part of the nineteenth century. It is believed that this was due primarily to changes in agricultural practice which adversely affected food and cover conditions. Numerous attempts have been made at reestablishing bobwhites. Chief among these

was a program entailing the release of approximately 68,000 birds during the period from 1931 to 1939. In general, these efforts were unsuccessful. The present-day range of the species is confined chiefly to Long Island, although fair numbers occur in certain counties bordering the lower Hudson and Delaware Rivers. Isolated colonies have been reported from a few upstate counties." From conclusions: "The factors which are considered to have contributed to the disappearance of quail from upstate New York, as well as to the failure of attempts at restocking, are (1) changes in farming practices with a resultant decrease in food supply and undesirable changes in cover conditions, (2) the introduction of ring-necked pheasants into many parts of the former quail range, and (3) severe winter weather. The latter factor is thought to have assumed greater significance as the decrease in availability of suitable food and cover became more pronounced."

Gullion, Gordon W. (Nev. Game Comm.) LET'S GO DESERT QUAIL HUNTING. Nev. Game & Fish Comm., Biol. Bul. no. 2. 1-76 p., illus. May 1956.

Good semipopular bulletin on biology and management of Gambel quail in Nev. Material is presented in form of conversations between state game technicians and hunters. The bulletin has an index and a list of literature cited. "Briefly, the conclusions indicated are: that young-adult ratios largely govern the effort required to bag a quail, more even than the abundance of the birds; that there isn't much size difference between quail from various areas in southern Nevada; that quail populations living in different habitat types must be managed differently; that desert quail populations have annual turnover rates of about 70 percent per year; that the desert food resource is strictly limited both areawise and weatherwise and quail must be managed within the area limits and seasonal variations of this resource; that ample fall and winter rainfall is the key to high quail numbers; that double-brooding apparently occurs under extraordinary weather conditions; that guzzlers can be used to increase huntable populations of desert quail under certain conditions; that economically feasible predator control will not increase or stabilize desert quail populations (and probably will not assist quail populations under any conditions); that management of cover is needed in valley areas; that normally the release of game-farm reared quail will not increase populations; that refuges are not needed to preserve breeding populations of quail; and that there are several methods by which huntable quail populations can be increased, or the percentage-wise take of the annual surplus increased."

Toschi, Augusto. ESPERIENZE SUL COMPORTAMENTO DE QUAGLIE (COTURNIX C. COTURNIX (L.)) A MIGRAZIONE INTERROTTA. Ricerche de Zoologia Applicata Alla Caccia (U. Bologna, Italy) 27. 1-275 p. 1956.

English summary, 30 p. of text in Italian, and 239 p. of tables and individual records. In the period 1938-54, about half a million quail were captured along the s. and middle Adriatic littoral and in the Pontine Islands. These quail were distributed, within 3 months of capture, to Italian hunting groups for dog training. Recoveries of 6,175 of these quail are discussed and tabulated here. Particular attention is given to changes in migratory behavior caused by transplanting. Comparisons are made between travels of local and transported quail, and between quail recovered in the year of banding and those recovered later. Only a few individuals gave evidence of changes in migratory behavior. More evident results appeared in recoveries of birds imported from Egypt. From these one can conclude that the effects of transportation are in direct proportion to the distance, especially when transplants are made along the parallels. There is no evidence of lasting repopulation as a result of these quail transplants; effects disappear within a few months.

PHEASANTS

Anon. A NEW PHEASANT FOR ILLINOIS? Ill. Wildl. 11(4): 10-11 (unnumbered), 8 photos. Sept. 1956.

Midwestern pheasants do not succeed in s. Ill. Yeatter's work showed that one factor was effect of heat on eggs. Pheasants from s. Calif. have more heat-tolerant eggs. Birds of this Calif. strain have been propagated in Ill. and released at Neoga, near s. margin of pheasant range in Ill.

PHEASANTS--Continued

Novak, Clyle A. (Utah Game Dept., Logan.) A PRELIMINARY STUDY OF THE INFLUENCE OF MAGPIE PREDATION ON PHEASANT POPULATIONS IN IDAHO. Master's thesis, U. Idaho. 1956. [From Idaho Coop. Wildl. Res. Unit Quart. Rep. 9(2).]

Pollack, Bill. (Mass. Div. Game.) PHEASANT FACTS. Mass. Wildl. 7(5): 1-7, 14-15, 3 photos. Sept.-Oct. 1956.

Present status of pheasants and their habitat in Mass., and policies of the state in respect to them. Some 65% to 80% of pheasants bagged in Mass. are naturally produced, but so little good habitat remains and hunting pressure is so heavy that stocking is still done extensively, especially in poorer habitats. Cost of stocking is exorbitant but stocking of cocks will be continued. Shooting of hens cannot be permitted because it has been found to entail too large a loss of natural breeders. So much pheasant habitat has been lost in recent years that the Sportsmen Club Rearing Program, for which the state distributed chicks, will be discontinued. On the whole, the outlook for pheasant hunting in Mass. is not good despite the state's attempt to get better habitat management on private lands and its program of acquiring and managing public hunting areas.

Sandnes, G. C. EVOLUTION AND CHROMOSOMES IN INTERGENERIC PHEASANT HYBRIDS. Evolution 8: 359-364. 1954. [From notice by D. W. S. in Ibis 98(4).]

"Reviews the chromosome morphology of four phasianid genera, Gallus, Phasianus, Syrmaticus and Chrysolophus. It appears that all these genera must have all, or almost all, their gene loci in common. Gallus differs from the other three in having two pairs of chromosomes fewer in each sex, but this seems to be due only to the separation of some of the chromosome arms in the three other genera."

Westerskov, Kaj. (Wildl. Div., Wellington, N. Z.) PHEASANT MANAGEMENT AND SHOOTING IN NEW ZEALAND / AN EVALUATION OF RESTOCKING AND SHOOTING, AND SOME SUGGESTIONS FOR MANAGEMENT. N. Z. Dept. Internal Affairs, Wildl. Publ. no. 40c. 1-57 p., 19 figs. 1956.

"In this bulletin are discussed the economics and practical value of restocking with pheasants; the effects of shooting on pheasant numbers and the feasibility of bag limits and variations in length of the open season; and finally various recommendations for practical management. It is contended that routine restocking does not materially increase shooting, is far too costly considering its poor results, and consequently cannot be recommended. It is suggested that open seasons on pheasants might very well be brought in line throughout New Zealand and extend for two months; also, it is proposed that bag limits on pheasants be abolished as they under present conditions serve no useful purpose. It is vital that hens are protected and saved during the shooting season."

GROUSE, PARTRIDGE, ETC.

Blank, T. H., and J. S. Ash. (Game Res. Sta., Burgate Manor, Fordingbridge, Hampshire, Eng.) THE CONCEPT OF TERRITORY IN THE PARTRIDGE PERDIX P. PERDIX. Ibis 98(3): 379-389, 4 figs. July 1956.

Summary: "1. Partridge territory (as defined) is of two types--covey territory (late summer and early winter) and pair territory (late winter and early summer). 2. The only defended part of their territory is a restricted area surrounding the birds, which moves with them throughout their range, but is most extensive and tends most to coincide with the range of the pair in late March and throughout April. 3. Unmated cock Partridges show no territorial behavior. If a mated cock Partridge loses its mate territorial behavior ceases within a few days unless another mate is secured. 4. There is considerable overlap of covey and even pair territory, although in the latter this is much reduced during the pre-nesting period in Perdix. Territory distribution is closely associated with the available food supply. 5. Proximity tolerance between coveys and between pairs appears to depend on the relative dominance of the cocks concerned."

CHUKAR COMMITTEE SEMI-ANNUAL REPORT. Vol 3, no. 2. About 80 variously numbered pages. Mar.-Aug. 1956. [This issue was distributed by B. C. Game Dept., 567 Burrard St., Vancouver.]

Most recent issue of what was formerly called "Western States Chukar Committee Quarterly Report." It is more than a western states series, for it contains reports from the western Canadian provinces, Hawaii, and New Zealand. It is more than a chukar report, for it contains data on releases of such exotics as brown francolins, red-legged partridges, black partridges, etc. The bulk of it, however, consists of reports of varying length on chukars in different areas: overwintering success, water needs, effect of drought and range conditions, dependence on or independence of farming, foods, new releases, reproduction, methods of census, and related topics. Although "Not for publication," the series is an excellent source of data on current work with chukars in various areas and with other exotic game birds in the western U. S. and Canada.

Greenhalgh, Clifton M., and Rhy B. Hyatt. (Utah Dept. Game.) RESEARCH ON GAME FARM METHODS IN CHUKAR PARTRIDGE PRODUCTION. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 215-218. 1956.

Breeding practices, release policy, feeding, incubation, care of young, control of diseases with drugs.

Heebner, Gordon C. (U. Idaho.) A STUDY OF THE LIFE HISTORY AND ECOLOGY OF THE BLUE GROUSE IN WEST CENTRAL IDAHO. M.S. thesis, U. Idaho. 51 p. 1956.--P. D. Dalke.

Hoffmann, Robert S. (Mont. State U.) OBSERVATIONS ON A SOOTY GROUSE POPULATION AT SAGE HEN CREEK, CALIFORNIA. Condor 58(5): 321-336, 4 figs. Sept.-Oct. 1956.

Behavior of a small, semi-isolated population was studied and compared with behavior described for other populations. The population differed from most others in that there was no seasonal altitudinal migration and no flocking. Distinctions between courtship behavior of dusky and sooty grouse are pointed out. These distinctions seem to be correlated with differences in habitats. Behavior of the sooty grouse studied was characteristic of the sooty grouse group although the area was close to the range of dusky grouse both in location and habitat. This suggests that sooty and dusky grouse are relatively distinct even though conspecific. Population trends were followed by counts of displaying males and by volume of droppings at winter roosts. Both indicated a sharp decline of sooty grouse in late 1952. Snowshoe hares declined at the same time. These data, considered with all available data from the literature, suggest that sooty grouse may participate in the 10-year cycle.

Nilsson, Nils N. (Nev. Game Comm.) PRESENT TECHNIQUES AND INVENTORY METHODS IN CHUKAR MANAGEMENT. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 179-182. 1956.

Reviews the many methods used by different states to obtain data on numbers of chukars.

Palmer, Walter L. (Wildl. Exp. Sta., Houghton Lake Heights, Mich.) RUFFED GROUSE POPULATION STUDIES ON HUNTED AND UNHUNTED AREAS. Trans. 21st N. Am. Wildl. Conf. p. 338-344. 1956.

A population study of ruffed grouse during a 6-year period, 1950-55, was conducted on 2 areas, hunted and unhunted. Population estimates were derived from 4 census methods: drumming counts in spring, pre- and post-season strip censuses, analyses of hunting data, and Lincoln Index. Although some census data were subject to wide confidence limits, a comparison of the data from 2 years yielded some basic and valuable information. On the very heavily hunted area, the kill av. 4.5 grouse per 100 acres. The harvest averaged about 1/3 the pre-hunting population. Spring populations in general were 1/3 as large as previous fall populations on both areas. Use of Lincoln Index was possible late in the study period. Band returns showed grouse to be quite mobile. This mobility may affect results of such a population study owing to egress and ingress. Author concludes that much larger study areas should be used if further study is warranted; perhaps islands offer the best opportunities. In summary, hunting pressure had no effect on grouse population levels.—Author.

Vertse, A., Z. Zsák, and Z. Kaszab. FOOD AND AGRICULTURAL IMPORTANCE OF THE PARTRIDGE (PERDIX P. PERDIX L.) IN HUNGARY. Aquila 59-62: 13-68. 1955. [From notice by F. J. T., Ibis 98(3).]

Hungarian with English summary. "The results, based on 1007 stomachs from different seasons of the year, are tabulated according to species and according to the month (April to November). The Partridge is shown to be mainly herbivorous (granivorous) with a shift to mainly insect foods during the summer."

DOVES AND PIGEONS

Hon, William Harris. (Tenn. Game Comm.) THE STATUS OF A GROUND-NESTING POPULATION OF EASTERN MOURNING DOVES IN COASTAL NORTH CAROLINA. M.S. thesis, N. C. State Coll. 1956. [From Wildl. Curriculum News Letter no. 2, N. C. State Coll.]

From thesis abstract: Doves were studied on a group of treeless islands near Beaufort, N. C. in summers of 1951 and 1954. Ground-nesting doves were compared to tree-nesters in the same vicinity by nest-censusing, trapping and marking, recording of flights, and general behavior. 22 ground nests were found. "When sixteen of these were revisited, it was found that parents deserted all six discovered prior to clutch completion, five of nine with full clutches, and one of two with nestlings. Ground nestlings left the nest at ten or eleven days of age and did not return. The extensive and regular occurrence of ground-nesting on these islands seems to be the realization of a normal potential made possible by lack of predation and the presence of all necessary elements including an excellent food supply."

Jumber, J. F., E. L. Kozicky, and D. L. Carter. (Iowa State Coll.) FACTORS INFLUENCING MOURNING DOVE PRODUCTION AT LEWIS, IOWA, 1955. Iowa Bird Life 26 (3): 59-61. Sept. 1956.

Of 203 active nests, 61% were successful and fledged 227 young. High winds caused 54.9% of the 71 nest failures. Desertion, house cats, and undetermined causes accounted for the rest of the failures. Infertile eggs were rare--less than 2% in sample of 48 eggs. Number of eggs per nesting varied from 1-3, av. 2.01. Tree species most important in providing nest sites were Am. elm, box elder, and soft maple. Locations of nests are tabulated and discussed.

Kiel, William H., Jr., and John T. Harris. (Texas Game Comm., San Juan.) STATUS OF THE WHITE-WINGED DOVE IN TEXAS. Trans. 21st N. Am. Wildl. Conf. p. 376-388. 1956.

White-winged doves face an uncertain future as game birds in Texas. Destruction of over 95% of the native brush nesting habitat in the lower Rio Grande Valley plus heavy hunting pressure and high losses to predators have reduced the whitewing population drastically. Hunting seasons were closed in 1954 and 1955. A severe freeze in 1950-51 destroyed 85% of the citrus trees used by nesting whitewings and the breeding population dropped from an estimated 1,039,000 birds in 1950 to 110,000 in 1951. Nesting studies were based on 10,295 eggs over a 9-year period, 1947-55. Hunting statistics indicated that a higher percentage of the fall population was shot in years of low numbers than in years of abundance. Their gregarious nature and regularity of flight make whitewings susceptible to over-shooting. Biologists have recommended for 15 years that some native brush habitat be preserved, but to this date no land has been set aside for white-winged doves.

Peters, Harold S. (US F&WS, Atlanta, Ga.) BANDING--A KEY TO DOVE MANAGEMENT. Trans. 21st N. Am. Wildl. Conf. p. 365-375, 1 map. 1956.

Approximately 145,000 mourning doves have been banded, 2/3 of them during the last 7 years. To Dec. 1, 1955 there were 5,448 recoveries, about 3.7%. About 3% of banded doves are reported shot. There have been 1,221 recoveries from doves banded as nestlings; 79.4% of them were taken in the state where banded. Analysis of recoveries seems to indicate that most doves are shot in the state where they were reared, especially during Sept. hunting seasons. However, banding has not been uniform in all states; it has been especially scarce in north-central states which furnish many doves to southern hunters. Need for additional nestling banding is evident. Tabular data are presented for recoveries from all banding; this constitutes the first nation-wide analysis ever attempted.--Author.

Schultz, Vincent. (U. Md.) A STUDY OF MOURNING DOVE MORTALITY IN THE SOUTHEAST. J. Tenn. Acad. Sci. 31(4): 275-286. 1956.

The great ice storm of Jan.-Feb. 1951 took a heavy toll of doves. Evidence analyzed here suggests that mortality was so heavy that the population was still low in the fall of 1951 despite a good breeding season. No similar decline appeared in areas not hit by the storm.

WATERFOWL

Benson, Dirck, and Gerald E. Cummings. (N. Y. Cons. Dept.) SOME IMPLICATIONS OF WATERFOWL TRAPPING RECORDS FROM THE OAK ORCHARD GAME MANAGEMENT AREA. N. Y. Fish & Game J. 3(2): 205-216. July 1956.

Abstract: "As part of a statewide waterfowl banding program in New York, trapping operations have been carried on at the Oak Orchard Game Management Area. During 1953 and 1954 some 3,670 mallards, black ducks, and wood ducks were taken and daily tallies were kept showing age, sex, and frequency of recurrence in the traps. These records provide data pertaining to the susceptibility of these species to trapping by age and sex, the effect of trap location, the representativeness of sex and age ratios obtained, and the local movements which occur during the fall stopover. In addition, methods by which banding and retrapping records can be used as an aid in analysis of migration data are suggested."

Benson, Dirck, and Donald Foley. (N. Y. Cons. Dept.) WATERFOWL USE OF SMALL, MAN-MADE WILDLIFE MARSHES IN NEW YORK STATE. N. Y. Fish & Game J. 3(2): 217-224. July 1956.

Abstract: "During 1953, 1954, and 1955 studies were conducted on 559 small marshes created under Federal Aid... The studies included observations on the pairs of breeding ducks attracted to these areas, brood production, and fall use by waterfowl. The records obtained demonstrate the importance of these areas to waterfowl, as well as the variations in use and in the species frequenting them in different parts of the State. They also give some indication of the change in use as the number of years of flooding increased. The problems of assigning brood production values to the individual marshes are discussed." Small marsh units are more productive than larger ones. Productivity and attractiveness of these marshes tend to decline after the third year. About 2 pairs of breeders may be expected on marshes that average about 5 acres in size.

Chupp, Norman R. (US F&WS, Wenatchee, Wash.) AN EVALUATION OF THE LOWER COEUR D'ALENE RIVER WATERFOWL HABITAT IN KOOTENAI COUNTY, IDAHO. M.S. thesis, U. Idaho. 1956.--P. D. Dalke.

Craighead, John J., and Dwight S. Stockstad. (Mont. State U.) MEASURING HUNTING PRESSURE ON CANADA GEESE IN THE FLATHEAD VALLEY. Trans. 21st N. Am. Wildl. Conf. p. 210-238, 12 figs. 1956.

Numbers and movements of geese were studied in relation to hunting pressure and kill in Flathead Valley of Mont., 1953-55. Most of the geese hunted were locally reared. In 2 of 3 years, number of geese shot was directly proportional to size of population. In the other year, lack of goose movement made the relationship inverse. There was little correlation between numbers and movement of geese. There was direct correlation between amount of goose movement and number shot, and between number shot and intensity of hunting pressure. Movement of geese was governed by biological drives rather than by hunting pressure. In 1954 and 1955, 90% of known movement in and out of refuges occurred during shooting hours. Neither local nor migratory movements could be correlated with weather conditions. Skill and experience of hunters determined their success. In the 3 years, geese killed and crippled amounted to 14.6, 29.2, and 38.6% of av. hunting season population. Cripple loss av. 24.7% of bag. Best possibilities for local management are manipulation of hunting pressure and goose movement. Ways of approaching these are discussed.--Authors.

Delacour, Jean. THE WATERFOWL OF THE WORLD. VOL. II. Country Life Ltd., 2-10 Tavistock St., London WC2, Eng. 1-232 p., 24 pl., 29 maps. 1956. $21.25.

Second of 3 volumes of a set every waterfowl biologist and wildlife library will want. Vol. I covered geese, shelducks, and others. Vol. II covers the 37 species of dabbling ducks assigned to the genus Anas as well as 5 "aberrant monospecific genera." Aside from the illustrations, the strength of the book lies in its accounts of species: descriptions of adults, young, and eggs are followed by statements of distribution, maps, accounts of habits (mostly short), and records of status in captivity. Subspecies are treated similarly but more briefly. Some keys are included. Biological observations by other workers are quoted for various species and conservation is discussed where especially pertinent. The 24 color plates by Peter Scott are a valuable feature of the volume. They depict downy young, females, and males in both breeding and eclipse plumages. As a whole, the volume will prove indispensable for many purposes, but in view of its great cost we would have appreciated fuller data on such topics as variation, habits, behavior, abundance, and conservation. Perhaps the bibliography, promised for vol. III, will compensate in part for this weakness.

Farr, Marion M., and Virginia G. Blankenmeyer. (US Dept. Agr., Beltsville, Md.) TRICHOBILHARZIA BRANTAE N. SP. (TREMATODA: SCHISTOSOMATIDAE) FROM THE CANADA GOOSE (BRANTA CANADENSIS L.). J. Parasit. 42(3): 320-325, 13 figs. June 1956.

Foley, Donald D. (N. Y. Cons. Dept.) USE OF COLORED MARKERS ON DUCKLINGS. N. Y. Fish & Game J. 3(2): 240-247, 2 figs. July 1956.

From abstract: "For a study of survival of three strains of mallard ducklings, the birds were marked with both plastic neck tags and celluloid leg bands... The tags were made from regular Duran upholstery material and were pinned to the nape with stainless steel safety pins... The markers were of definite value in differentiating strains as well as in making observations easier. It was also thought that reports of band recoveries were increased somewhat. Throughout the period during which the ducklings were flightless the neck markers were retained fairly well, and even at the time the birds began flying about 70 per cent still wore them. It was believed that most of the neck-markers had been lost 14 weeks after release of the ducklings, and only one was recovered during the first hunting season with a tag. Band retention was much better: during the first hunting season 74 per cent were reported as still wearing a full set; this dropped to about 23 per cent for the second and third hunting seasons. The practicality of these as well as other marking methods, for short-term studies, is discussed."

Gollop, J. B. (Can. Wildl. Serv., Saskatoon, Sask.) THE USE OF RETRIEVERS IN BANDING FLIGHTLESS YOUNG MALLARDS. Trans. 21st N. Am. Wildl. Conf. p. 239-248. 1956.

Summary: "Data are presented on the results of three years' experience with five dog-crews banding flightless young mallards in the Kindersley, Saskatchewan, district. Habitat and techniques are described. One Labrador-golden retriever cross and two Chesapeake Bay retrievers were used to help catch 1,818 local mallards. The average season's catch for a two-man dog-crew working the equivalent of 12 full days were 349 young mallards. This was well below the potential catch by dog-crews because of drive-trapping. Although the samples are small, a comparison of direct returns for local mallards caught by dog-crews with those caught in drive-trapping operations indicates no difference in recovery rates." Conclusion: "From the data presented above, we conclude that to catch an adequate, well-distributed sample of mallards (and pintails) in the 'grassland' habitat of southwestern Saskatchewan and southeastern Alberta, the most efficient and practical technique is the use of retrievers."

Hester, Francis Eugene. (Ala. Poly. Inst.) THE WOOD DUCK IN EAST CENTRAL NORTH CAROLINA. M.S. thesis, N. C. State Coll. 1956. [From Wildl. Curriculum News Letter no. 2, N. C. State Coll.]

From thesis abstract: Wood ducks were studied on 3 ponds from Sept. 1953 to June 1955. Migration reached a peak in last week of Oct. in both years. The largest numbers of wood ducks seen coming into the ponds in Oct. 1953 were

144, 70, and 166. Afternoon flights into roosts usually began near sunset and continued until dark. The largest flock contained 19, but flocks of 2 were commonest, which indicated early pairing. Boxes were erected on the 3 ponds, but they were used at only 1 pond. Three boxes yielded 1 nest the 1st year; 5 boxes yielded 6 nests the second year.

Jensen, G. Hortin. (US F&WS, Bear Riv. Refuge, Brigham, Utah.) A SUMMARY OF APPLIED TECHNIQUES IN WATERFOWL BREEDING GROUND SURVEYS IN ALBERTA, CANADA. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 188-190. 1956.
Tells how aerial surveys of waterfowl breeding are now made. Problems involved in relating aerial observations to actual conditions on the ground are outlined; these problems are now under correlated ground and air studies.

Keeler, James E. (3576 Georgetown Drive, Montgomery, Ala.) ALABAMA WATERFOWL BAND RECOVERIES 1929-1956. Ala. Dept. Cons., Fed. Aid in Wildl. Restoration, Spec. Rep. no. 1. 57 unnumbered p., maps, proc. Sept. 1956.
Text and maps for each species (ducks, geese, coot) show point of banding for banded birds found in Ala., and where birds banded in Ala. were found in other states or provinces. Text also gives data on av. and maximum times between banding and recovery for each species.

Kozlik, Frank M. (Calif. Dept. Game.) COLOR-MARKING WHITE GEESE FOR DETERMINING MIGRATION ROUTES. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 145-152. 1956.
Tests revealed that lesser snow geese and Ross's geese could be stained satisfactorily with Rhodamine B, malachite green, and picric acid. Methods are described. Some hundreds of the geese have been colored. Sightings of colored geese are listed individually and are discussed briefly. Reports were obtained mainly through the mechanism of the Pacific Flyway Study Committee.

Lostetter, Clinton H. (US F&WS, Sacramento, Calif.) ENVIRONMENTAL CONTROL IN WATERFOWL. Trans. 21st N. Am. Wildl. Conf. p. 199-208, 3 photos. 1956.
Increased reclamation and drainage projects have markedly reduced our natural waterfowl habitat. To compensate, in part, for loss of this habitat federal and state waterfowl management areas have been established. This program includes planting cultivated and natural waterfowl foods and manipulation of water levels. Efforts to time crops for full utilization by waterfowl have been successful. Purchase and development of governmental management areas is costly. Federal and state programs can be assisted materially by development of suitable habitat on private lands. Such private developments include proper food plantings and control of water levels. The paper presents examples of this work in Calif. Past programs have shown that a proper pattern of food plantings and water control is of genuine value in controlling crop depredations and maintaining the waterfowl of the Pacific Flyway.--C. H. Lostetter.

Neely, Wm. W. (US Soil Cons. Serv., Walterboro, S. C.) HOW LONG DO DUCK FOODS LAST UNDERWATER? Trans. 21st N. Am. Wildl. Conf. p. 191-198, 3 figs. 1956.
Summary: "The rate of deterioration when underwater is an important consideration in the selection of duck foods to be grown in practical management. There is little point in having a high yielding food which rots away within a few weeks. Field measurements of comparative rates of deterioration were made by exposing samples of seeds underwater in trays or plastic screen envelopes. Percentage of deterioration was computed by weighing the samples before and after exposure." Only sound seed was tested. "The species of seeds tested were found to vary greatly in keeping qualities. The percentage of deterioration of 25 species after 90 days underwater is presented graphically in Figure 2." Fastest deterioration was in soybeans (86%), pearl millet, cowpeas, German peas, Jap millet, and corn. Least deterioration was in bulrush (1%), beakrush, bullgrass, sesbania, acorns, and smartweed. Other seeds were intermediate.

Salter, Robert L. (Idaho Game Dept.) CANADA GOOSE NESTING STUDIES IN IDAHO. Proc. 36th Ann. Conf. W. Assn. State Game & Fish Comms.: 191-194. 1956.
How production is determined, how large production has been on 7 areas (1952-56), and how difficult it is at present to correlate aerial survey data with numbers of nests and production. Local studies of this type are important because they show what populations need more protection and how populations are responding to changes of regulations. Examples are given.

Salyer, J. Clark, II. (US F&WS.) GAINS AND LOSSES IN THE WATERFOWL GAME. Trans. 21st N. Am. Wildl. Conf. p. 100-112. 1956.
The Number One problem of North American waterfowl management is, and continues to be, the accelerated loss of basic waterfowl habitat, which is decreasing a hundred times faster today than we are able to restore it. Mr. Salyer discusses the factors responsible for the loss of waterfowl habitat, the adverse effect of mosquito control, management of waterfowl to reduce mortality from disease, gains in law enforcement, expansion of investigations to gain sound management data, methods employed by F&WS to pyramid waterfowl populations on existing federal lands, state contributions to waterfowl management, and how River Basin studies are helping to save waterfowl habitat. In conclusion, Mr. Salyer stated, "the most favorable trend I can discover these days is a greater awareness throughout our general population of the values of our waterfowl resource and the practical measures necessary to keep it whole." --Edna N. Sater.

Uhler, Francis M. (Patuxent Refuge, Laurel, Md.) NEW HABITATS FOR WATERFOWL. Trans. 21st N. Am. Wildl. Conf. p. 453-469. 1956.
Constant loss of our waterfowl areas makes it essential to convert as many waste areas as possible to waterfowl habitat. This paper reviews work done at Patuxent Research Refuge to develop many kinds of low-grade land into waterfowl habitat. Among the methods discussed are: biennial drawdown of impoundments with re-flooding in 3 stages; design and construction of water-control structures; reduction of turbidity by use of decaying plant material; management of a pool that receives effluent from sewage plant; management of old gravel pits; conversion of shrub swamps and timber swamps into waterfowl marshes; development and maintenance of good meadows on poor, acid soils; construction and use of nesting islands; control of predators by strychnine-treated eggs, drawdown, etc.; and establishment of new waterfowl populations by release of young birds or pinioned adults. Plants found useful under different situations are listed with mention of their utility. Kinds and numbers of waterfowl now using Patuxent impoundments are listed.

Yocom, Charles F., Charles L. Buschele, and Stanley W. Harris. (Humboldt State Coll.) GREAT BASIN CANADA GOOSE NESTING POPULATIONS AT THE FORMER LAKE LENORE NATIONAL WILDLIFE REFUGE, WASHINGTON. Murrelet 37(2): 14-17, 1 map. May-Aug. 1956.
"In summary, it was estimated that about 50 pairs of geese nested annually at the Lake Lenore National Wildlife Refuge. This establishes this area as an important location for this species. If each pair brought off three to four young successfully, an increase of 150-200 birds per year would be added to the population. The significance of the amount of hunting that can be derived from such production cannot be overlooked. All possible measures should be taken to maintain this important goose nesting area and to coordinate fishing dates so that the population would remain undisturbed during the critical breeding season."

CRANES, RAILS, SHOREBIRDS

King, J. M. B. SOME EXPERIMENTS IN TRAPPING WADING BIRDS. Northw. Nat. (N.S.) 2: 377-383. 1954. [From J. Anim. Ecol. 25(1).]
"An account of attempts to trap waders in the Hilbre-Hoylake area with clap traps, which were too slow in action, funnel traps, which were too laborious for the results achieved, and clover-leaf traps, which were moderately successful on seaweed-covered rocks."

Tanner, Ward D., Jr., and George O. Hendrickson. (Iowa State Coll.) ECOLOGY OF THE KING RAIL IN CLAY COUNTY, IOWA. Iowa Bird Life 26(3): 54-56. Sept. 1956.
Nests and nest sites are described, migration dates are given, and incubation and production are discussed. "On 96.4 acres of marsh searched, six occupied nests were found in 1951. Of 60 eggs in six nests, 39 hatched between June 9 and June 23. The estimated incubation period in one closely watched nest was at least 21 days. Four successful nests produced a total of 39 young, an average of 9.8 per successful nest, or one young to about 2 acres on 81.4 acres of suitable cover."

Yocom, Charles F. (Humboldt State Coll.) RE-ESTABLISHMENT OF BREEDING POPULATIONS OF LONG-BILLED CURLEWS IN WASHINGTON. Wilson Bul. 68(3): 228-231, 1 fig. Sept. 1956.
Various recent breeding records are listed. Restoration of this curlew apparently can be attributed to a change from farming to grazing of the poorer lands and to improved range management.

OTHER BIRDS

Allen, Robert Porter. THE FLAMINGOS: THEIR LIFE HISTORY AND SURVIVAL. Natl. Aud. Soc., Res. Rep. no. 5. 285 p., illus. 1956. $3.95. [From review by P. A. Zahl, Aud. Mag. 58(6).]
Result of nearly 4 years of study of status, ecology, and conservation problems. The report "will no doubt stand for many years as the work on flamingos, as well as a procedural format for conservationists in other fields. The volume, excellently laid out and beautifully illustrated, is scholarly without being pedantic, scientific without being obscurely technical. Nearly a thousand bibliographic text references, representing our total knowledge of both New and Old World flamingo species, are assessed, integrated, and listed. Such a contribution to ornithological literature would in itself have justified publication of the report. Add to this Mr. Allen's detailed field study of the habits, food sources, distribution, and general natural history of the West Indian flamingo, together with his searching analysis of factors contributing to the flocks' decimation in recent years, and we have the substance of a most valuable work... Egg-collecting, hunting, disturbance by low-flying aircraft, unnecessary visits to flamingo colonies during the nesting season, etc., represent the sort of molestation that on many a Caribbean island has had so damaging an effect on the flamingo. Most such activities, even on remote cays, could be prevented through the dissemination by locally served conservation groups of educational information and, when necessary, through the sponsorship by such groups of warden systems and the enactment and enforcement of protection laws."

REPTILES AND AMPHIBIANS

Brown, E. E. (Davidson Coll.) NESTS AND YOUNG OF THE SIX-LINED RACERUNNER CNEMIDOPHORUS SEXLINEATUS LINNAEUS. J. Elisha Mitchell Sci. Soc. 72(1): 30-40, 2 figs. May 1956.

Brown, Jack Stanley. THE FROGS AND TOADS OF ALABAMA. Ph.D. thesis, U. of Ala. 323 p. 1956.
A detailed study of the 29 spp. and ssp. occurring in the state, with keys to eggs, tadpoles and adults to aid in their identification. Complete descriptions of all stages are included, along with data on ecology, habits, metamorphosis, distribution, and relative abundance.--Ralph L. Chermock.

Conant, Roger. (Philadelphia Zool. Soc., Phila. 4, Pa.) A REVIEW OF TWO RARE PINE SNAKES FROM THE GULF COASTAL PLAIN. Am. Mus. Novitates no. 1781. 1-31, 12 figs. July 1956.
Good, detailed study of the interesting, little-known, and somewhat controversial black and Louisiana pine snakes. Author concludes by recommending that all U. S. Pituophis be considered ssp. of melanoleucas.

Gosner, Kenneth L., and Irving H. Black. (Newark [N. J.] Mus.) NOTES ON AMPHIBIANS FROM THE UPPER COASTAL PLAIN OF NORTH CAROLINA. J. Elisha Mitchell Sci. Soc. 72(1): 40-47, 1 graph. May 1956.
Annotated list of frogs (also Triturus) with special reference to variation in Bufo terrestris and B. w. fowleri and Hyla andersoni.

Hutchison, Victor H. (Duke U.) AN ANNOTATED LIST OF THE AMPHIBIANS AND REPTILES OF GILES COUNTY, VIRGINIA. Va. J. Sci. 7(2): 80-86. Apr. 1956.

Kennedy, J. P. (U. Texas.) FOOD HABITS OF THE RUSTY LIZARD, SCELOPORUS OLIVACEUS SMITH. Texas J. Sci. 8(3): 328-349, 5 figs. Sept. 1956.
Seasonal foods of young and adults, parasites in stomachs, and notes on habits of the lizards.

Klauber, Laurence M. RATTLESNAKES / THEIR HABITS, LIFE HISTORIES, AND INFLUENCE ON MANKIND. Publ. for Zool. Soc. San Diego by U. Calif. Press, Berkeley & Los Angeles. Two vols. xxix + 1476 p., 243 figs., 2 col. pls., 58 tables. 1956. $17.50 a set.
An encyclopedic work that includes virtually everything known about rattlesnakes. Dr. Klauber has long been known for his distinguished research on rattlers and other reptiles. In these monumental volumes he presents not only findings from his own famous studies, but also a vast amount of information from the literature, as indicated by the 140-p. bibliography. In addition, he has tapped an unusual source of data by corresponding with hundreds of field men who had experience with rattlers in the wild. The result is a great work that has no equal in the amount of knowledge it gives on a single group of reptiles. It is written to be useful to layman or professional--to one seeking complete information or one who merely wishes to settle a bet. Name the subject and you will find it treated here--in simple language and probably in monographic detail. Identification is made easy by illustrated keys to rattlesnakes of different regions and by photographs, range maps, and tables of variation. After a section on paleontology and phylogeny come chapters on morphology, rattles, bodily functions, behavior, populations and ecology, foods, reproduction, poison apparatus, bites, treatment and prevention of bites, control and utilization, enemies, Indians and rattlesnakes, myths and folklore. This list scarcely suggests the wealth of fact presented. Each chapter is a mine of scientific and historical information. Klauber's own analysis and judgment are presented, often with new data, when the views of others conflict. It hardly need be said that this work should be available to every herpetologist and every person who must answer the public's inquiries about natural history. It will also be of great interest to those concerned with animal behavior, reptilian morphology, problems of snakebite, and the folklore of reptiles.

Martof, Bernard. (U. Ga.) FACTORS INFLUENCING SIZE AND COMPOSITION OF POPULATIONS OF RANA CLAMITANS. Am. Midl. Nat. 56(1): 224-245, 7 figs. July 1956.
Detailed discussions are given of various factors that were found to affect size and composition of green frog populations throughout the year near Ann Arbor, Mich. Among these factors are differential hibernation behavior, reproductive behavior, increase of population by reproduction, seasonal movements, dispersal, weather, mortality, and pathology. Population estimates are presented and difficulties in making them are analyzed. Turnover of a population is shown to be very high. About 45% of adults were recaptured, but only about 5% of newly transformed young. This rapid turnover is countered by high production: at one peak of emergence, 10,500 young frogs were estimated to be present on an area of 6,090 sq. meters.

Moss, Don. (Ala. Dept. Cons.) THE EFFECT OF THE SLIDER TURTLE "PSEUDEMYS SCRIPTA SCRIPTA" (SCHOEPFF) ON THE PRODUCTION OF FISH IN FARM PONDS. Proc. SE. Assn. Game & Fish Comm. Meeting, 1955. p. 97-100. 1956.
Four Ala. farm ponds of 1/4 acre each were stocked with bass and bluegills in spring of 1950. Two of the ponds were fenced and stocked with Pseudemys at rate of 100 per acre. Ponds were fertilized and managed identically except for the turtle stocking. Ponds were drained in fall of 1950. Av. yield of fish from ponds containing turtles was about 258 lbs. per acre as compared to 264 lbs. for the controls. It is interesting that this result was obtained although

turtles were so much in need of food that they were unable to grow or even maintain their weights. "The contents of 58 slider turtle stomachs that were trapped from various ponds in Central Alabama were analyzed and it was found that the food consisted of approximately 80 percent vegetable matter and 20 percent animal matter. Filamentous algae made up approximately 45 percent of the total diet while fish constituted less than 3 percent." Foods are reported by volume and frequency.

Piano, Arthur G. F. A SURVEY OF THE INTESTINAL FLAGELLATES OF CERTAIN SALAMANDERS. M.S. thesis, U. of Ala. 64 p. 1956.
125 specimens of salamanders from se. U. S., representing 14 spp., were examined for parasites. The following were found: Trichomonas augusta, Proteromonas lacertae-viridis, Octomitus dujardini, and 2 new spp. of Chilomastix. Detailed descriptions and illustrations of the flagellates are provided and a list of hosts is included.--Ralph L. Chermock.

Prince, E. C., R. Duppstadt, and D. J. Lyons. AN ANNOTATED LIST OF AMPHIBIANS AND REPTILES FROM THE BROAD CREEK-DEEP RUN AREA, HARFORD COUNTY, MARYLAND. Md. Nat. 25(1-4): 9-12. 1955 [1956].
Brief comments on abundance and/or habitats of 40 kinds.

Reed, Clyde F. INDEX TO HERPETOLOGICA, 1936-1955. Publ. by and available from author, 10105 Harford Rd., Baltimore 34, Md. v + 132 p. 1956. $4.00 (paper) + 10¢ postage.
Consists of author and subject indexes. Author index is good, with full titles and dates being given. Subject index is chiefly a species index, with indications of authors and topics under species. General subjects are not well indexed, but nevertheless this index should be extremely useful.

Schwartz, Albert. (Albright Coll.) THE RELATIONSHIPS AND NOMENCLATURE OF THE SOFT-SHELLED TURTLES (GENUS TRIONYX) OF THE SOUTHEASTERN UNITED STATES. Charleston (S. C.) Mus. Leafl. no. 26. 1-21 p., 8 figs. May 1956.
Evidence that T. ferox is specifically distinct from T. spinifer and that T. s. agassizii should be synonymized under T. s. asper.

Stewart, Margaret McBride. (Cornell U.) THE SEPARATE EFFECTS OF FOOD AND TEMPERATURE DIFFERENCES ON DEVELOPMENT OF MARBLED SALAMANDER LARVAE. J. Elisha Mitchell Sci. Soc. 72(1): 47-56, 2 graphs. May 1956.
Laboratory experiments and field studies "show that higher temperature and food abundance each hasten metamorphosis and increase the rate of growth, whereas only the second factor is apparently responsible for the greater length at metamorphosis at the two particular temperatures used" in experiments. Stomach contents are reported for 330 wild-caught larvae.

Tinkle, Donald W. (W. Texas State Coll.) NOTES ON THE SALAMANDER, EURYCEA LONGICAUDA GUTTOLINEATA, IN FLORIDA. Field & Lab. 20(3): 105-108. June 1952.
Includes data on foods of 60 individuals.

Tinkle, Donald Ward. THE SYSTEMATICS AND ECOLOGY OF THE STERNOTHERUS CARINATUS COMPLEX (TESTUDINATA: CHELYDRIDAE). Ph.D. thesis, Tulane U. 274 p. 1956. [From long abstract in Dissertation Abstracts 16(9).]
Taxonomy, variation, skulls, speciation, growth rate, sex ratios, size and age at sexual maturity, egg production, food and feeding habits, habitats.

Turner, Frederick B. REPTILES AND AMPHIBIANS OF YELLOWSTONE NATIONAL PARK. Yellowstone Libr. & Mus. Assn., Yellowstone Interpretive Series no. 5. vii + 40 p., map & 20 illus. 1955.
A good, popular, local handbook that has real reference value because biological observations in the park are reported, records and identifications are scrutinized carefully, and precise locality records are listed. Enough general information and illustrations are included to make the pamphlet a useful handbook for laymen.

FISHES

Zim, Herbert S., and Hurst H. Schoemaker. FISHES / A GUIDE TO FAMILIAR AMERICAN SPECIES. Simon & Schuster, N. Y. Golden Nature Guide Series. 160 p., with 278 species illus. in full color. 1956. $1.00 paper, $1.95 cloth.

This attractive little book consists largely of excellent paintings by James Gordon Irving of our common and/or representative fresh and salt water fishes. The text gives simple but worthwhile information on relationships, habits, and importance of the species or groups. Brief introductory sections outline structure, history, and conservation. Common names are used throughout, but scientific equivalents are listed just in front of the index. The book can give only a thin sampling of our ichthyofauna, of course, but as a handsome, popular introduction to this fauna it is well worth its price and may interest some readers in deeper study of the subject.

INVERTEBRATES

Crumb, S. E. THE LARVAE OF THE PHALAENIDAE. US Dept. Agr., Tech. Bul. no. 1135. ii + 356 p., 11 pls., 4 figs. July 1956. $1.25 from Supt. Documents.

Keys, descriptions, and illustrations of diagnostic features for identification. Distribution and food plants are listed for species. The family is a large one that includes cutworms, armyworms, corn earworms and many others. Representatives of the family are commonly encountered in food-habits studies of vertebrates.

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